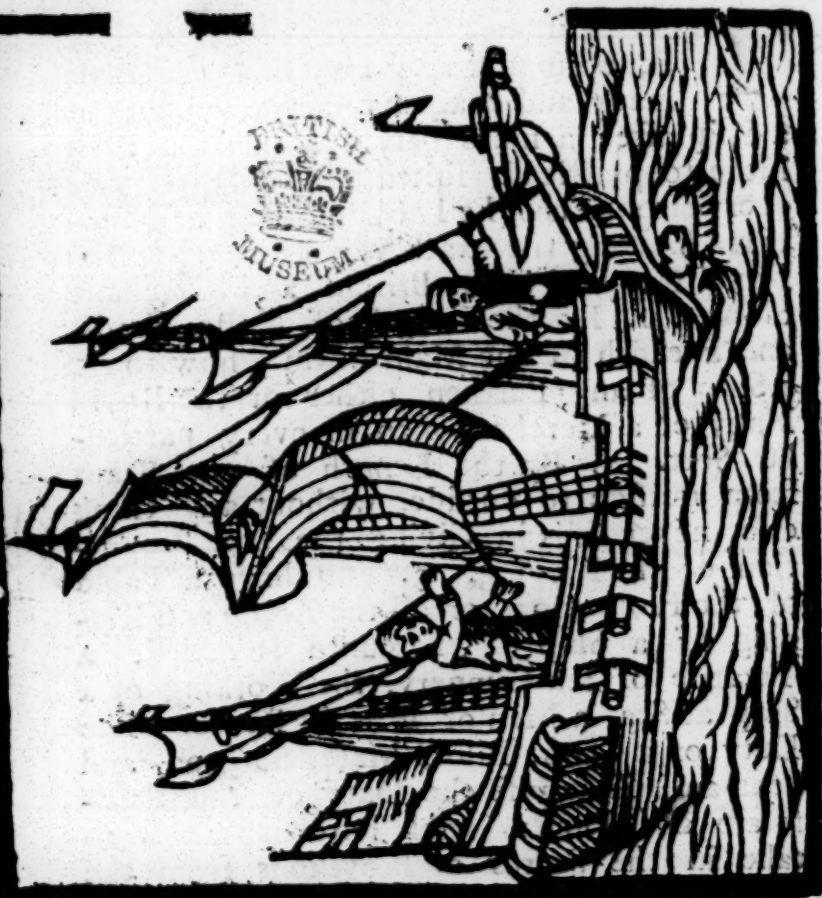




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By JAMES LOVE, *Mathematician.* K

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CHAP. I.

Of Decimal Arithmetick.

Notation of Decimals.



DECIMAL is that by which is distinguished the Parts of a Unit: And is decreased from Unity to so many tenth Parts of a Unit. For Unity is divided into 10 Parts; and every 10th Part is called a Prime, every Hundred Part is a Second, and every Thousand Part a Third, &c. So as whole Numbers increase by Tens from the Units place towards the Left Hand, so Decimals decrease by Tens from the Unit's Place towards the Right Hand, as may appear by the following *Example*.

A 3

6 Sixths;

1	Unity, or an Integer.
10	Primes, or tenth parts.
100	Seconds, or hundred parts.
1000	Thirds, or thousand parts.
10000	Fourths or 10 thousand parts.
100000	Fifths, or 100 thousand parts.
1000000	Sixths, or 1000000 parts.

For 10 Primes is one Unit, and 10 Seconds is one Prime, and 10 Thirds is one Second, and 10 Fourths is one Third, &c. So that every place towards the Left, is 10 times less than the preceding Figure: For preponing of Cyphers, lessen the following Figure in a tenfold manner; for (2.) is two Primes, or two tenths of an Integer or Unit; but (.02. is but two Seconds, or two Hundredth parts of an Unit. Cyphers after a Decimal neither augment nor diminish the Value of the Decimal.

A Decimal is always distinguished from a whole Number by a Prick or Period, as in Numbers following.

45.3 365.3 .262 .15 1625.32 273.2

The

The *Numerators* are only set down, the *Denominators* being known by the Number of places in the *Numerator*; for if the *Numerator* consist but of one place, as .1, it is $\frac{1}{10}$; if of two, as .22, it is $\frac{22}{100}$; if of three, as .235, it is $\frac{235}{1000}$, &c.

I shall insist no more upon *Notation of Decimals*, the foregoing being sufficient; but shall proceed to *Addition*.

Addition of Decimals.

Addition is the adding of Summs together, and making one intire Summ of two or more: You must take particular Care in placing Whole Number under Whole Number, and Decimal under Decimal, and Units under Units, and Tens under Tens.

Suppose 325.7 were to be added to 463.72, I place them one under another, in manner following:

$$\begin{array}{r}
 \text{To} \quad \text{---} \quad 463.72 \\
 \text{Add} \quad \text{---} \quad 325.7 \\
 \hline
 \text{Summ} \quad \text{---} \quad 789.42
 \end{array}$$

Observe always to prick off as many Decimals in the Total, as there is in the biggest Decimal given to be added.

B 4

Example.

Example.

$$\begin{array}{r}
 \text{To} \text{ --- } 365.23 \\
 \text{Add } \left\{ \text{ --- } 23.20 \right. \\
 \quad \quad \quad \text{2.03} \\
 \hline
 \text{Summ --- } 390.46
 \end{array}$$

*An Example of Addition, as to Timber,
or Board Measure.*

Note, That all intire Quantities, as Feet, Yards, Ells, Ounces, Pounds, and Hundred Weights, are divided into a Hundred Parts, therefore the one fourth of any of these is .25, the half is .50, and the three Fourths is .75.

There is three Boards of these following Dimensions ; what is the Summ of Feet and Parts ?

Feet Parts

$$\begin{array}{r}
 \text{The first Board --- } 246.25 \\
 \text{The second --- } 43.50 \\
 \text{The third --- } 16.26 \\
 \hline
 \text{The Summ --- } 306.01
 \end{array}$$

The

The Total Summ is 306 Foot, and one hundredth part of a Foot.

Addition of Money.

A Pound *Sterling* is likewise divided into 100 parts. So .05 is the Decimal for one Shilling, and .10 for two Shillings, and .15 for three Shillings, &c.

Suppose I were to add 3 Shillings and 4 Pence to two Shillings and 3 Pence.

The Decimal for 3 Shill. is .15

The Decimal for 2 Shill. is .10

The Decimal for 4 Pence is .0166667

The Decimal for 3 Pence is .0125

Summ .2791667

It is very hard for the Learner to know the Value of this Total, being he is not come the Length of Multiplication, which is the only Rule useful in this Case. The general Rule is, Every Prime or Unit in the Total Sum is 2 s. Value, and every 5 Seconds is 1 s. and the superplus of the Seconds above 5 is so many Ten Farthings, and the number of Digits in the Third's place is so many Farthings: All the rest of the Decimals to the Right being of no Value. The 2 Primes in the Total is 4 s. and the 5 Seconds of the 7 is 1 s.

B 5

and

and the two remaining is 20 Farthings; the 9 Thirds added thereto makes 29 Farthings, which is 7 d. Farthing; but by reason the number is above 25, the Farthing must be cut off. The Summ is 5 s. 7 d.

So much for *Addition of Decimals*.

Subtraction of Decimals.

Subtraction is the taking a small Summ from or out of a greater, as if you would take 7 l. 5 s. 6 d. out of 10 l. 5 s. 6 d. the Remainder must be 3 l. or if from 265.2, you will take 153.1, &c.

Example.

From 105.25 Foot of Superficial Measure, Subtract 97.25.

$$\begin{array}{r} 105.25 \\ 97.25 \\ \hline 8.00 \end{array} \left. \vphantom{\begin{array}{r} 105.25 \\ 97.25 \\ \hline 8.00 \end{array}} \right\} \text{ or } \left. \vphantom{\begin{array}{r} 1035.2 \\ 973.5 \\ \hline 61.7 \end{array}} \right\} \text{ from } \begin{array}{r} 1035.2 \\ 973.5 \\ \hline 61.7 \end{array}$$

From .876

Take .124

Remains .552

From 725.2

Take 322.6

Remains 402.6

Multi-

Multiplication of Decimals.

In *Multiplication of Decimals* the Method is the same as in Whole Numbers ; only you are to prick off so many Decimals towards the Right Hand in the Product, as there is Decimals in both *Multiplicator* and *Multiplicand* : As suppose I were to multiply 26.75 by 35, there must be two Decimals pricked off in the Product, by reason there is two in the *Multiplicand*.

*Example 1.**Of Mixt Numbers.*

$$\begin{array}{r}
 \text{Multiplicand} \text{---} \text{---} 26.75 \\
 \text{Multiplicator} \text{---} \text{---} .35 \\
 \hline
 13375 \\
 8025 \\
 \hline
 \text{Product} \text{---} \text{---} 936.25
 \end{array}$$

Example 2.

$$\begin{array}{r}
 246.32 \\
 24.61 \\
 \hline
 24632 \\
 147792 \\
 98528 \\
 49264 \\
 \hline
 6061.9352
 \end{array}$$

Ex-

Example 3.

$$\begin{array}{r} 32.6 \\ .2 \\ \hline 6.52 \end{array}$$

Example 4.

$$\begin{array}{r} 6.32753 \\ 32.64 \\ \hline 2531012 \\ 3796518 \\ 1265506 \\ 1898259 \\ \hline 206.5305792 \end{array}$$

Here you see in the fourth *Example* there is in the Multiplicator and Multiplicand 7 Decimals; therefore I prick off as many in the Product as there is in both.

Note, That as Whole Numbers multiplied by Whole Numbers, increase their Value, so Decimals multiplied by Decimals decrease their Value, by reason the Product is removed farther from Unity than either of the Decimals given to be multiplied, as shall appear by the following *Example*.

$$\begin{array}{r} .03 \\ .2 \\ \hline .006 \end{array}$$

$$\begin{array}{r} .75 \\ .04 \\ \hline .0300 \end{array}$$

$$\begin{array}{r} .32 \\ .4 \\ \hline .128 \end{array}$$

It will sometimes fall out that there are not so many Figures in the Product as there are Decimals in the Multiplicand and Multiplier; in such Cases you must place Cyphers before the Figures till they be equal: As you shall see in the following Work.

Example.

	1.004	.42	6.5	.22
	.002	.07	0002	.4
Prod.	.00008	.0294	.00130	.088

Division of Decimals.

We shall in the next place proceed to *Division of Decimals*, which is the most difficult of all the rest; all the Difficulty being to find the true Value of the *Quotient*.

The general Rule is, When you have finished your Division, to prick off so many Figures to the Right Hand, in the *Quotient*, as will make the *Decimals* in the *Divisor* equal in Number to those in the *Dividend*; and the Figures to the Left are Whole Numbers.

Example

Example 1.

Let 64.326 be divided by 32.4

$$\begin{array}{r}
 32.4 \overline{) 64.326} \quad (19 \\
 \underline{31.92} \\
 2.766 \\
 \underline{174}
 \end{array}$$

You see in the foregoing Work that there is three Decimals in the Dividend, and one in the Divisor; therefore I make that 1 in the Divisor, and 2 in the Quotient, equal to the 3 in the Dividend.

Example 2.

$$\begin{array}{r}
 329 \overline{) 53.62321} \quad (161.19 \\
 \underline{20.12} \\
 923 \\
 \underline{2982} \\
 571 \\
 \underline{246}
 \end{array}$$

Example 3.

Let 28 be divided by 32.6
 In this Example the Divisor 32.6 is greater than

than 28, the Dividend; in this, and all other such Cases, you must place a competent number of Cyphers behind the Dividend; and if it be a Whole Number you are to divide; you must prick off the Cyphers from the Whole Numbers, and then proceed in your Division, as you were to divide Whole Numbers.

$$\begin{array}{r}
 32.6 \overline{) 28.00000} \quad (.8585 \\
 \underline{1920} \\
 2900 \\
 \underline{1920} \\
 290
 \end{array}$$

Example 4.

To divide a Decimal Fraction by a Decimal Fraction.

Let .900 be divided by .05

$$\begin{array}{r}
 .35 \overline{) .900} \quad (18.0 \\
 \underline{40} \\
 00
 \end{array}$$

Let .9000 be divided by .0005

$$\begin{array}{r}
 .0005 \overline{) .9000} \quad (1800 \\
 \underline{40} \\
 000
 \end{array}$$

Would

Would not one think it very strange a Decimal Fraction, divided by a Decimal Fraction, should bring forth a Whole Number in the Quotient! But I shall make it very plain that it must be so, and no otherways, by reasonable Demonstration.

By the first Example you see I divide .900 by 95, and the Quotient I find to be 18.0, that is, because there is three Decimals in the Dividend, and one in the Divisor, I make up the Number of those in the Dividend by taking one Decimal from the Quotient, and adding to the 2 in the Divisor.

Now the Nature of the Question is thus : I desire to know how many times 5 Seconds in 9 Primes? The Answer is 18. For there is 18 times 5 Seconds, in 9 Primes.

If it fall out at any time that there is not so many Figures in the Quotient as will make these in the Divisor equal in Number to those in the Dividend, then you must prefix Cyphers before the Quotient to the Left Hand, as in the following Example.

$$4) .13779 \quad (.03444$$

I shall give you an Example as to the Use and Application of Division of Decimal Fractions, to the End that those who intend to use Decimals may the better understand what they are going about.

Suppose

Suppose I were to divide 10 Shillings among 20 Men, the Decimal for 10 Shillings is .50, therefore I divide my Decimal .50 by the Number of Men 20, and the Quotient will be .025, which is the Decimal equal to 6 Pence; for if you multiply .025 by 12, and double the Product, it will be 6 Pence.

I could give several Examples of this kind, but the various Examples that will happen in the following Work, will, in its proper place, give a clearer Demonstration than can be here expected; so I shall refer the Learner to the Practice in general, and proceed to my intended Work.

The Extraction of the Square Root.

First, A Square Number is any Digit, or any other Number; which being multiplied by (or into) itself, produceth a Square Number, as 9 being multiplied into itself, by saying, 9 times 9, produceth the Square Number 81; the Root of which is 9.

Secondly, Square Numbers are either Single or Compound.

Thirdly, A single Square Number is that, which being produced by the Multiplication of one single Figure by itself, and is always less than 100; so 36 is a single Square Number, produced by 6; likewise 7 multiplied by itself, produceth the Square Number 49.

Fourthly,

Fourthly, All the single Square Numbers, together with their respective Roots, are set down in the following *TABLE*.

<i>Roots</i>	1	2	3	4	5	6	7	8	9
<i>Square</i>	1	4	9	16	25	36	49	64	81

Fifthly, When the Root of any square Number is required, it being lesser than 100, and yet is not exactly a single *Square* expressed in the *Table* above, then you are to take the Root of that single square Number, expressed in the said *Table*, which (being less) is nearest to the given Square; as if it were required to find the Root of 60, it would be found to be 7; and 11 being given, the Root that belongs to it is 3.

Sixthly. A Compound square Number is that, which being produc'd by a Number (that consists of more Places than one) multiplied by itself, is never less than 230: So 727 is a Compound square Number produc'd by the Multiplication of 27, multiplied by itself.

Seventhly, The Root of any Number, under 100, may be easily discover'd by the *Table* of single Squares: But to extract the Root of a Compound square Number, consisting of Integers, observe these following Precepts.

First, Point the given Number, *viz.* place a Point

Point over the first Figure, towards the Right-hand, omitting every other Figure, place one over the 3d, 5th, and so on, according to the Number of Places.

The Figures thus distinguished are called Points, (or Squares) and as many Points as are in the Number given for Extraction, of so many Places (or Figures) consists the Root, if the Number be an exact Compound Square.

Secondly, When you have thus prepared your Number, then draw a crooked Line on the Right-hand of your Number; behind which you are to place the Root, as you do for a Quotient in *Division*.

Thirdly, When your Number is prepared, find out the square Root of the first Square (or Point, by the Table of single Squares) and place that Root behind the crooken Line, and subtract the said Square from the first Point, subscribing the remainder underneath the first Point.

Fourthly, To this Remainder bring down the next Point, (or Square) and place it on the Right-hand thereof, which call the *Resolvend*.

Fifthly, Double the Root of the first Point, and place it on the Left-hand of the *Resolvend*,

vend, distinguishing it therefrom by a crooked Line, thus) which call your *Divisor*.

Sixthly, Seek how often this Divisor is contained in all the Figures of the Resolvend, except the last towards the Right-hand, and place the Answer in the Quotient, and also on the Right-hand of the Divisor.

Seventhly, Multiply the Divisor by the Figure last placed in the Quotient, and subtract that Product from the Resolvend, subscribing the Remainder.

Lastly, To this Remainder bring down the next Point for a new Resolvend, and proceed as with the first Resolvend, repeating the Work of the 5th, 6th, and 7th Precept foregoing, and continue so to do till the Extraction be finished. A few Examples will make it plain.

The first Example.

I desire to know the Square Root of 729.
First, The Number being prepared, by pointing it, (according to the first 729. Precept) stands thus; which consists of two Points, (or Squares) and therefore the Root sought is to consist of two Figures or Places.

Secondly,

Secondly, Draw a crooked Line (as is before taught) and the Work will stand thus.

Thirdly, The greatest Square in the first Point 7, is 4, whose Root is 2, wherewith proceed, according to the 3d Precept, and the Work will stand thus :

$$\begin{array}{r} 729 \\ 4 \end{array}$$

Fourthly, To the Remainder 3 bring down your next Square 29, and work according as you are directed in the 5th, 6th, and 7th Precepts foregoing, and the Work will stand thus.

$$\begin{array}{r} \text{Rem. } 3 \\ 721 \text{ (Root } 27) \\ 4 \\ \hline 47 \text{ (} 329 \text{ Refol.} \\ \text{Div. } 329 \text{ Prod.} \\ \hline 0 \end{array}$$

Here you are to note, That the Points being all brought down, and 0 remaining, shews the Works to be finished; and also that 729 is an exact square Number, whose Root is found to be 27, as will appear; for if you square 27 (which is the Proof of the Extraction of the square Root) you will find the Product to be 729, which was the Number proposed.

Note likewise, That if at any time (when you have multiplied the Number standing in the place of the *Divisor* by the Figure last placed in the Quotient or Root) the Product be greater than the *Resolvend*, the Work is erroneous.

erroneous, to correct which you are to put a less Figure in the Quotient: But if the Remainder is greater than the next Divisor, put a greater Figure in your Quotient, and proceed according to the 6th Precept, &c.

It is also worth observing, That the Reason why every other Figure is pointed, it is because the Square of any one single Figure never exceeds two Places.

The working of two or three Questions more (at large) will (I presume) make the Extraction of the Square Root (of any exact square Number) intelligible enough to an ordinary Capacity.

More Examples.

What's the Square of 15129?

First, Prepare the Number according to the first and second Precepts, and your Work will stand thus:

Then the Operation of the 3d Precept being performed the Work standeth thus:

Then proceed according to the 4th Precept, and the Work standeth thus:

. . .
 15129(
 . . .
 15129(
 1
 ———
 Rem. 0
 . . .
 15129, (1
 1
 ———
 31 Resolve.
 The

The Operation
of the 5th Precept
observed, the Work
stands thus :

15129 (2

1

Divis. 2). 51 Resolv.

1512912

1

The Operation
of the 6th Precept
being observed,
the work stands
thus :

1st Div. 22). 51 Resol.
44 Prod.

Remainder 07

Lastly, The O-
peration of the
5th, 6th, and 7th
Precepts, being
duly performed,
the Work will
stand as you see;
which shews
15129 is an ex-
act Square Num-
ber, found by
Squaring 123.

15129

15129(123

1

1st Div. 22). 51 Resolv.
44 Prod.

2d Div. 243). 729 Ref.
729 Pro.

0

What

What is the Square Root of

12299049 (3507 the Root
9 sought.

1st Divisor 55) 329 Resolvend.
325 Product.

2^d Divisor 700) 490 Resolvend.
000 Product.

3^d Divisor 7007) 49049 Resolvend.
49049 Product.

.....
0

Here you are to note, That when the Divisor cannot be had in the Resolvend, (according to the 6th Precept) then, in that Case, you are to place a Cypher in the Quotient, and also on the Right Hand of the Divisor, and then bring down the Resolvend a Step lower, and bring down the next Square to it (as in the last Example) for a new Resolvend; or let both the Resolvend and Divisor remain, and bring down the next Point to it: The last Example again repeated, will shew you more plainly.

(25)

12299049 (3507 the Root,
9

Divisor 65) 392 Resolvend.
325 Product.

Divisor 7007) 49049 Resolved.
49049 Product.

0

What's the Square Root of

9042049 (3007 the Root.
9

6007) 042049 Resolvend.
42049 Product.

0

The Operation after the other Method,
will be as followeth.

B

9042049

Di-
(ac-
Cafe,
ient,
ifor,
Step
to it
end;
main,
The
w you

99049

$$\begin{array}{r}
 \dots\dots\dots \\
 9042049 \text{ (3007)} \\
 9 \\
 60) 94 \text{ Resolvend.} \\
 00 \\
 \hline
 600) 0420 \text{ Resolvend.} \\
 .000 \text{ Product.} \\
 \hline
 6007) .42049 \text{ Resolvend.} \\
 42049 \text{ Product.} \\
 \hline
 \end{array}$$

But if there be givsn an exact Square Number (to be extracted) consisting either of Whole Numbers, with Decimals annexed, or of Decimals alone, then point every other Figure in the Decimals, from the Place of Units towards the Right Hand, as you did in Whole Numbers towards the Left Hand, and as many Points as there are in the Decimals, so many Decimal Places there will be in the Root sought.

1. *An Example of Whole Numbers with Decimals.*

What's

(27)

What's the Square Root of

$\begin{array}{r} 141000,25 \\ 9 \end{array}$ (372,5 the Root.)

Divisor 67) 510 Resolvend.
469 Product.

Divisor 745) .4100 Resolvend.
3725 Product.

Divisor 7505) 35725 Resolvend.
37525

0

An Example of Decimals alone.

What's the Square Root of

$\begin{array}{r} .6620329 \\ 4 \end{array}$ (2573 the Root.)

Divisor 45) 262 Resolvend.
225 Product.

Divis. 507) 3733 Resolvend.
3549 Product.

Divis. 5143) 15429 Resolvend.
15429 Product

Here you are to take notice, (both in mixt Numbers and Decimals alone) That if the Number of Decimal Places be not even, viz. 2, 4, 6, or 8, &c. Places, such a Number is incommensurable to its square Root.

Note also, When a Decimal Fraction is proposed

posed for Extraction, which hath 2 or 3 first places towards the Left-hand, cut off two of them with a dash of a Pen, and place a Cypher in the first place of the Root; and if the given Decimal have Four Cyphers, then cut them off, and place two Cyphers in the Root, and proceed to extract the Square of the Remaining.

Thus the Square
Root of 002809,
is 053. See the Work
in the Margin.

$$\begin{array}{r|l} 00 & 2809 \text{ (,053 the} \\ & 25 \text{ Root.} \\ \hline & 103 \text{ (309} \\ & \underline{309} \\ & 0 \end{array}$$

Likewise the Square Root of ,000103041 will be found to be, ,00321.

Hitherto hath been spoken concerning the Extraction of the Square Root of any Square or Rational Numbers (whether Whole, Mixt, or Decimal) viz. Such as are Commensurable to their Roots.

But when there is given a Number that is not exact Square, that is, whose Root cannot be exactly found, such Numbers are called furd Numbers, (and they are Incommensurable to their Square Roots) and there will (after your last subtraction is made) be always a Remainder. To extract the Square Root of such Numbers as these, observe the following Directions.

When a furd Number is given to be extracted, consisting all of Integars, proceed therewith as with a Rational whole Number, till

till all the Squares are brought down, and then there will (always) be a Remainder; which shews, that the Number propos'd is a furd Number; and also, that you have already found the greatest whole Number that the Square Root can consist off; and to find the Decimal Fraction, (to be annexed to the Root found to bring it nearer to the truth) proceed thus; place two Cyphers on the Right Hand of the Remainder for a new Resolvend, and find also a new Divisor (wherewith proceed as you have been taught) and there will be produced one Figure more to be placed in the Quotient, which is the first Figure (or place of Tens) in the Decimals, and so by a continual annexing of two Cyphers to every last Remainder, you may continue the Extraction to as many Decimal Places as you please; for as many Pairs of Cyphers as are annexed, so many Places of Decimals are in the Root, which is to be distinguished from the rest by a Comma.

Example.

What's the Square Root of

43623 (208, 86. &c. the Root.
4

1st Divis. 408) 3623 Resolvend.
3264 Product.

2^d Div. 4168) 35900 Resolvend.
33344 Product.

3^d Div. 41766) 255630 Resolvend.
250596 Product.

Rem. --5004, &c.

B 3

Note,

Note, That (when a surd Number is proposed for Extraction, consisting of Decimals alone, or of Decimals annexed to whole Numbers) if your Number of Decimal Places be not even, viz. Two, Four, Six, &c. they must be made so by annexing a Cypher to the Right Hand, before you begin to point it.

An Example of a Mixt and Surd Number;

What's the Square Root of 321540,037 ?

$$\begin{array}{r}
 321540,0370 \quad (567, 405 \\
 25 \\
 \hline
 106) \quad 715 \\
 \quad 636 \\
 \hline
 1127) \quad 7930 \\
 \quad 7889 \\
 \hline
 113404) \quad 510370 \\
 \quad 453616 \\
 \hline
 1134085) \quad 5675400 \\
 \quad 5670425 \\
 \hline
 \text{Rem. } 4975, \text{ \&c.}
 \end{array}$$

Here you see the Number of Decimals is odd, therefore you must annex a Cypher to the Right Hand to make it even, and continuing the Extraction after all the Points are brought down, by annexing two Cyphers, (to come nearer the Truth) the Square Root will be 567, 045.

An

An Example of a Decimal, being a Surd Number.

What's the Square Root of

37 (,6082 the Root sought.
36

1208) 10000
9664

1162) 33600
24324

Rem. 9276

To prove the Extraction of the Square Root.

The Operation in the Extraction of the Square Root is thus proved, *viz.* Multiply the Root into itself, and (if there be no Remainder after the Work of Extraction is finished) the Product (if the Work be truly done) will be equal to the Number given. But if after the Work of Extraction is finished there be a Remainder, then when you have multiplied the Root by itself, to the Product add the Remainder; and if the Sum be equal to the Number given, the Operation is true, otherwise erroneous.

Thus much for the Extraction of the Square Root, wherein I have been the more large, to the End that it might be rendered intelligible to the meanest Capacities.

C H A P. II.

*To find the Burthen, and how to Rigg
a S H I P.*

BEFORE we proceed to the Rigging of a Ship, it is proper we should know her Burthen, they having a Dependence upon each other. For you cannot know how to Rigg a Ship without you know the Length and Breadth of her, no more than you can know her Burthen; but when she is once Rigg'd (if according to Art or Proportion) you may know her Burthen without taking the Length and Breadth: Therefore, I say, we shall begin gradually, first to know her Burthen, and so go on.

To find the Burthen of any Ship.

Take the Length of the Keel, and the Breadth of the Beam, from Plank to Plank, and multiply the one by the other, and the Product multiply by the depth of the Hold; and the last Product divided by 100, and the Quotient is the Burthen of a Ship; or, to save the Trouble of Division, cut off two Figures to the Right Hand of the last Product, and the remaining Figures to the Left Hand is equal to the Ship's Burthen.

Example.

(33)

Example.

The Length of a Ship's Keel is 68 Foot.

The Breadth of the Beam is 26 Foot.

$$\begin{array}{r} 408 \\ 136 \\ \hline \end{array}$$

$$\begin{array}{r} 1768 \\ \hline \end{array}$$

The Depth is $\frac{1}{2}$

$$\begin{array}{r} 3536 \\ 1768 \\ \hline \end{array}$$

The Ship's Burthen is 212.16.

The proper Divisors to be used here are 100 for *King's Tonnage*, and 95 for *Merchant's Tonnage*.

Two thirds of the Length of the Keel, and the Breadth of the Beam, is the Length of the Main-Mast.

Multiply the Length of the Main-mast by 8, and divide by 9 for the Length of the Fore-mast or Bowspirit.

The true Length of the Fore-mast is $\frac{2}{3}$ of the Main-mast.

The Mizzen-mast is $\frac{2}{3}$ the Length of the Fore-mast.

The Length of the Main-yard is the Breadth of the Beam, and $\frac{1}{2}$ the Length of the Keel.

The Fore-yard is $\frac{2}{3}$ the Length of the Main-yard.

The Spritsail-yard is $\frac{2}{3}$ of the Length of the Main-yard; but for the Thickness of Masts, for every 3 Foot in Length they ought

to be one Inch thick in the Partners, $\frac{7}{8}$ in the Middle, and $\frac{3}{4}$ at the Head; the Craggick-yard $\frac{2}{3}$ the Length of the Main-yard.

A Table of the Lengths and Thickness of the Masts and Yards of a Ship that is 25 Yards in length of the Keel, 9 Yards and $2\frac{1}{2}$ Foot length of Beam, and 4 Yards and a Foot in depth of Hold.

		Foot.	Inches.
The Fore-top-masts	Length	37	thick 13
The Main-top-masts	Length	42	14
The Spritsail-yard		50	16
The Mizon-mast		52	17
The Mizon-yard		51	16
The Fore-yard		62	20
The Bowspit		66	22
The Fore-mast		74	24
The Main-mast		84	28
The Main-Topfail-yard	} 11 Inches and Cross-Jack-yard.	36	7 $\frac{1}{2}$
The Fore-Topfail-yard		31	9
The Mizon-top-mast		27	8
The Main-top-gallant-mast		21	8
The Mizon-top-fail-yard		20	6
The Fore-top-gallant-mast		19	6
The Main-top-gallant-yard		19	6
The Fore-top-gallant-yard		16	5
The Sprit-fail-Top-fail-yard		14	4

A Table of the Names, Sizes, and Lengths of each Rope of Rigging belonging to the Mary and Bristol, whose length of Keel, breadth of Beam, depth in Hold, and Turns, is known.

BOLT-SPRIT, or SPRIT-SAIL-YARD.

	Mary		Bistol.	
	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Sheets	$3\frac{1}{2}$	60	3	56
Horse	$2\frac{1}{2}$	4	2	$3\frac{1}{2}$
Clulines	$2\frac{1}{2}$	34	2	32
Slings for the Yard	5	$4\frac{1}{2}$	$4\frac{1}{2}$	4
Hallyards	3	18	3	18
Lifts	3	40	3	36
Standing Lifts	$3\frac{1}{2}$	6	5	5
Lanyards	2	4	$1\frac{1}{2}$	3
Penants for Braces	3	3	$2\frac{1}{2}$	3
Falls to them	2	64	2	60
Wouldings	6	45	$4\frac{1}{2}$	31
Garnets	2	52	2	50
Buntlines	2	18	2	26

SPRIT-SAIL, TOP-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Shrouds	2	$27\frac{1}{2}$	2	16
Lanyards	$1\frac{1}{2}$	9	1	8
Penants of Braces	$1\frac{1}{2}$	4	$1\frac{1}{2}$	3
Falls to them	1	35	1	$3\frac{1}{2}$
Tyes	$2\frac{1}{2}$	$2\frac{1}{2}$	2	11
Hallyards	2	$9\frac{1}{2}$	$1\frac{1}{2}$	8
Clulines	$1\frac{1}{2}$	36	$1\frac{1}{2}$	32
Penants of the back	$3\frac{1}{2}$	3	3	3
Stays				
Falls to them	2	9	2	9
Lifts	$1\frac{1}{2}$	16	1	14
Parrel Rope	2	2	$1\frac{1}{2}$	2

FORE-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Penants of Tackles	$6\frac{1}{2}$	8	$5\frac{1}{2}$	6
Runners of Tackles	5	24	5	22
Falls of Tackles	$3\frac{1}{2}$	60	3	56
Shrouds	6	124	$5\frac{1}{2}$	91
Lanyard	$3\frac{1}{2}$	50	$3\frac{1}{2}$	35
Stay	$10\frac{1}{2}$	11	$8\frac{1}{2}$	$10\frac{1}{2}$
Collar	9	2	$7\frac{1}{2}$	$1\frac{1}{2}$
Lanyard	4	8	$3\frac{1}{2}$	7
Puttocks	3	46	$2\frac{1}{2}$	40
Parrel Rope	3	14	3	10
Clugarnets	$3\frac{1}{4}$	50	$2\frac{1}{2}$	48
Bowlines	$3\frac{1}{4}$	50	3	40
Bridles	$3\frac{1}{2}$	50	3	4
Penants for Braces	3	6	3	5
Falls to them	$2\frac{1}{2}$	50	$2\frac{1}{2}$	40
Buntlines	2	78	2	70
Sheets	$4\frac{1}{2}$	68	4	60
Tacks	6	30	$5\frac{1}{2}$	28
Lifts	3	58	3	46
Lichlines	$2\frac{1}{2}$	40	2	38
Geeres	$5\frac{1}{2}$	70	5	64
Leg of the Catarp.	2	18	$1\frac{1}{2}$	16
Falls to them	2	10	$1\frac{1}{2}$	8
Stoppers of the Top- <i>sail</i> Sheets	5	2	4	$2\frac{1}{2}$
Tye	0	0	$5\frac{1}{2}$	16
Hallyards	0	0	3	50

FORE-TOP-MAST

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Pen. of Top Rope.	7	12	5	12
Falls to the same	4	40	$3\frac{1}{2}$	38
Shrouds	4	52	3	52
			Lanyards	

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Lanyards	2	16	2	12
Stay	4½	14	4	15
Lanyard	3	10	2½	10
Lifts	2	50	2	50
Puttocks	2	24	2	24
Tye	6	7½	5	7
Runner	4½	9½	4½	9
Hallyards	3	42	2½	35
Bowlines	2	60	2	50
Bridles	2	10	2	10
Clulines	3	70	2½	65
Penant of Tackles	3½	6	3½	5
Falls to them	2	30	2	30
Sheets	5½	46	4½	40
Parrel Rope	3½	6	3	6
Lichlines	2	14	1½	12
Braces	2	66	2	50
Penant	2½	5	2½	5
Buntlines	2	34	1½	30
Stand. Back-stays	4	64	3½	62
Lanyards	2½	10	2	8

FORE-TOP-GALLANT-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Stay	1½	18	1½	15
Tye	2½	3	2	2½
Hallyards	1½	30	1½	30
Lifts	1	20	1	20
Bracas	1	60	1	50
Clulines	1½	60	1½	50
Bowlines	1	60	1	50
Bridles	1	5	1	5
Parrel-Rope	1½	2	1½	2
Shrouds	2	15		
Lanyards	1	6		

MAIN-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Penant of Tackle	7	8	6	6
Runners of Tackle	5	26	5	24
Falls of Tackle	3 $\frac{1}{2}$	60	3 $\frac{1}{2}$	56
Lifts	3	68	3	54
Shrouds	7	160	6	114
Lanyards	4	58	3 $\frac{1}{2}$	42
Stay	12	16	11 $\frac{1}{2}$	15
Collar	10	7	10	5
Lanyards	4	10	4	10
Penant of Garnet	5 $\frac{1}{2}$	10	5 $\frac{1}{2}$	9
Guy	5	9	4 $\frac{1}{2}$	8
Fall of the Garnet	3 $\frac{1}{2}$	37	3 $\frac{1}{2}$	37
Tacks Taper, Laid	6 $\frac{1}{2}$	30	6	28
Sheets	4 $\frac{1}{2}$	70	4 $\frac{1}{2}$	64
Clugarnets	3	56	2 $\frac{1}{2}$	54
Bowlines	3	40	3	40
Bridles	3	8	3	8
Penants of Braces	3	6	3	6
Falls	2 $\frac{1}{2}$	60	2 $\frac{1}{2}$	54
Geers	6	80	5 $\frac{1}{2}$	44
Parrel Rope	4 $\frac{1}{2}$	15	4	12
Lichlines	2 $\frac{1}{2}$	46	2	40
Buntlines	2	88	2	80
Puttocks	3	48	2 $\frac{1}{2}$	40
Legs of Catharp.	2	20	2	10
Falls to them	1 $\frac{1}{2}$	19	1	16
Stop of Top Sheets	5	3	4 $\frac{1}{2}$	3
Tackles to set up	} 3	20	2 $\frac{1}{2}$	18
Shrouds				
Busing Tackles	2 $\frac{1}{2}$	10	2	10
Tye	0	0	6	18
Hallyards	0	0	4	56

MAIN-

MAIN-TOP-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Penant of Tackle	3½	6	3½	6
Falls to them	2	34	2	34
Shrouds	4	74	3½	56
Lanyards	2	30	2	16
Stand Back-stays	4	72	4	66
Lanyards	2½	12	2	8
Stay	5	20	4½	18
Lanyards	3	10	2½	10
Lifts	2	64	2	60
Braces	2	68	2	52
Penant	2½	5	2½	5
Bowlines	3½	60	3	42
Bridles	3	10	2½	10
Pen. of Top-Rope	7	13	5	12
Falls to them	4	43	3½	40
Clulines	3	76	3	70
Tye	6	8½	5	7½
Runners	4½	18	4	18
Hallyards	3½	47	3	47
Lichlines	2	12	2	12
Buntlines	2	32	2	32
Puttocks	2½	32	2½	32
Parrel-Rope	3½	6	3	5
Sheets	6	50	5	50

MAIN-TOP-GALLANT-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Stay	2	20	1½	18
Braces	1	64	1	58
Bowlines	1	64	1	60
Bridles	1	5	1	5
Parrel-Rope	1½	2	1	2
Tye	2½	3½	2	3
				Hallyards

(40)

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Hallyards	$1\frac{1}{2}$	34	$1\frac{1}{2}$	34
Clulines	$1\frac{1}{2}$	64	$1\frac{1}{2}$	54
Lifts	1	22	1	22
Shrouds	2	14	0	00
Lanyards	1	16	0	00

MIZON-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Shrouds	4	62	4	56
Lanyards	2	16	2	16
Stay	4	$11\frac{1}{2}$	4	10
Lanyards	$2\frac{1}{2}$	3	2	3
Hallyards	$3\frac{1}{2}$	35	3	35
Parrel-Rope	$3\frac{1}{2}$	3	3	3
Trufs	$2\frac{1}{2}$	18	2	17
Sheet	3	20	3	18
Tack	$3\frac{1}{2}$	3	3	3
Bowlines	$2\frac{1}{2}$	16	2	10
Brayles	2	100	$1\frac{1}{4}$	90

GRAGGICK.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Lifts	$1\frac{1}{2}$	25	27	32
Braces	2	36	17	28
Standing Lifts	$2\frac{1}{2}$	6	2	6
Lanyards	$1\frac{1}{2}$	4	1	4

MIZON-TOP-MAST.

	<i>Inch.</i>	<i>Fad.</i>	<i>Inch.</i>	<i>Fad.</i>
Shrouds	2	28	2	18
Lanyards	$1\frac{1}{2}$	9	1	9
Puttocks	$2\frac{1}{2}$	12	$1\frac{1}{2}$	8
Braces	1	34	1	28
Bowlines	$1\frac{1}{2}$	34	1	28
				Bridles

		Inch.	Fad.	Inch.	Fad.
	Bridles	1	5	1	5
4	Tye	3	4	2 $\frac{1}{2}$	3 $\frac{1}{2}$
4	Hallyards	2	18	1 $\frac{1}{2}$	15
2	Lifts	1	24	1	10
6	Parrel-Rope	1 $\frac{1}{2}$	2	1 $\frac{1}{2}$	2
6	Stay	2 $\frac{1}{2}$	8	2	7
	Clulines	1 $\frac{1}{2}$	32	1	30
	Cat-Rope	1 $\frac{1}{2}$	50	3 $\frac{1}{2}$	40
d.	Penant of Fish-hook-	4 $\frac{1}{8}$			
56	Rope	6	7	5	7
16	Falls of the same	3 $\frac{1}{2}$	30	3	30
10	Stop at the Bow	6	28	4 $\frac{1}{2}$	18
3	Shank Panter	5	18	4 $\frac{1}{2}$	15
35	Stop at the Bits	9	8	8	8
3	Lanyards	3	12	3	12
17	Vial	9	30	7 $\frac{1}{2}$	22
18	Pen. of Wind. Tack.	8	10	8	9
3	Falls of the same	5	45	5	45
10	By Ropes	6	88	5	80
90	Stream-Anchor				
	Buoy Ropes	4	30	4	39
	Boat-Rope and Slings	7	37	5 $\frac{1}{2}$	35
Fad.	Guest-Rope to it	4	32	3 $\frac{1}{2}$	30
32	Pinnacle-Rope and				
28	Slings	6	36	0	00
6	Guest-Rope to it	4	32	0	00
4	Two Pair of Boat-				
	Slings	5	10	5	10
	Two Pair of Hogsets	4	8	4	8
	Ordnanace Slings	7	6	7	6
18	For Robins and Ear	1 $\frac{1}{2}$	260	1 $\frac{1}{2}$	200
9	And Clu Seifings for				
8	one compleat Suit	1	104	1	300
28	of Sails				
28					

Here follows an easie and exact Method for all *Boatswains, Gunners, or Carpenters* of Ships, whereby they may know what Quantity of Stores they have in the Ship at any time, without the Trouble of a Survey.

The Rule or Method for Boatswains, Gunners, or Carpenters, &c.

I Thought fit to propose this Method for the Ease of the Warranted Officers belonging to the King's Navy; and it may likewise serve for Officers in the Merchants Service, who are obliged to attend the Ship's Business all the Day long, and cannot take so much Time as to cast up their Accompts of Expence: And if they do but observe the Rule of the following Table, they may in Half an Hour know their Expence of Stores for a whole Month; it being no more Trouble, but only to enter the Head of the Table for the Month, and bringing down of their Finger in the Column of the Month till it come right over against the Quantity of the Stores Expended in that Month, and Subtract the Expence from the whole Charge, or from the Remainder of the former Month, and by this Means they know the Quantity of Stores that they have still Remaining, and can never be at a Loss for not knowing what Quantity of Stores they have in the Ship.

Example

Example.

Suppose a Boatswain of a Man of War makes a Demand for 235 Yards of Holland Duck, and in the Month of November he hath Occasion to Expend 53 Yards, and in the Month of December he has Expended 14 Yards, in January 21 Yards, in February 18 Yards, and in March 39 Yards, and he would know how much he hath in Store at the End of each Month.

	Novem.		Decem.		Jann.		Febru.		May.	
	Exp.	Rem.	Exp.	Rem.	Exp.	Rem.	Exp.	Rem.	Exp.	Rem.
Whole Charge, 235 Yds.	53	182	14	168	21	147	18	129	35	96

An

Example

An Abstract of Stores Expended.

		Whole Charge	Aug.	Sept.	Octob.
		Expended	Remains	Expended	Remains
Lines	Cabin	00			
	Deepsea	2 00	2 00	2 00	2
	Lashing	00			
	Logg	23 00	23	4 19	4 19
	Tarr'd	00			
	White	3 00	3	1 2 00	2
		1.			
Marline	Tarr'd	40	2 38 00	38 00	33
	White	17	3 14	3 11 00	11
Rope	Netting	00			
	Old for Round	00			
Spun-yarn		00			
		1.			
Twin white		56 00	56	5 51 00	51
Glasses	Watch	01 00	1 00	1 00	1
	half Watch	3 00	3 00	3 00	3
	half Hour	4 01	3 00	3 00	3
	half Minute.	6 00	6 00	6	2 4
Anchor of	28 Cwt.	1 00	1 00	1 00	1
	27 Cwt.	1 00	1 00	1 00	1
	25 Cwt.	1 00	1 00	1 00	1
	7½ Cwt.	1			
	3½ Cwt.	1			
Andirons		pr 1 00	1 00	1 00	1

*An Abstract of
Stores Expended.*

	Whole Charge	Aug.		Sept.		Octob.	
		Expended	Remains	Expended	Remains	Expended	Remains
Bilboes with 5 Sheckles	pr 1		1		1		1
Boom Irons	4		4		4		4
Chain top	2		2		2		2
Creepers	1		1		1		1
Crows	2		2		2		2
Esses for Kettles	1		1		1		1
Fenders	1		1		1		1
Woodfids Splicing	2		2		2		2
Fire {	Fork	1	1		1		1
	Shovel	1	1		1		1
	Tongs	1	1		1		1
Gapnels {	Boat	1	1		1		1
	Hand	1	1		1		1
	Fere & Chain	2	2	1	1	1	
Gromets and Staples							
Hammers fide	2		2	2	2		2
Hatchets	6		6	1	4		4
{ Boat	3	1	2		1	1	
	pr						
{ Cann	1		1		1		
	Fish	2	1	1			
Hooks {	Flesh	1	1				1
	Gaminging						
{ Kettle	pr						
	1		1		1		1
{	8	1	7	1	6	1	5
	Locks Hanging	4	4		4		4
Martin Spikes	16		16		16	2	14

<i>An Abstract of Stores Ellpend.</i>		Whole Charge	August.		Septemb.		Octob.	
			Expended	Remains	Expended	Remains	Expended	Remains
Mauls Top		2	00	2	00	2	00	2
Nails Hamocks		600	00	200	400	200	00	200
Blackening Barrels		12	00	12	2	10	2	8
Brushes large		2	00	2	00	2	1	1
		pr.						
Cloth	Duck	432	14	284	43	241	30	211
	Suffolk	59	9	50	13	27	00	37
	Nayeles	16	0	16	4	12	00	12
	Ipswich	25	6	19	00	19	00	19
	Victory	240	00	240	144	69	36	60
Old		00						
Colours	Breadth							
	Ensigns of	3	1	3		3	1	2
	Do. Whitt.	1	00	1		1		1
	Flags		1					
	Jacks	3	02	2		2		2
	Do. Whitt.	1		1		1		1
	Pendants.	4	150	3		3	1	2
	Do. Whitt.	1		1		1		1
	Vanes	00						
	Waste Cloths	1 pr		1		1		1
Top Armour								
Hamockers		200		50		50	10	40
Compasses		10		10		10		10
1 Do. Brass Box		2		3		2		2
Kettles	C ppers	2		2		2		2
	Fish	1		1		1		1
	Small	1		1		1		1

Nov		Decem.		Jan.		Feb.		Marc.		April		May	
Expended	Remains	Expended	Remains	Expended	Remains	Expended	Remains	Expended	Remains	Expended	Remains	Expended	Remains
100	2	100	2	100	2	100	2	90	2	35	2	18	2
1	8	1	8	2	6	1	5	5	1	4	1	3	3
1	198	32	167	77	90	90	24	90	28	62	35	27	7
3	37	9	37	13	24	24	9	24	12	12	5	1	1
6	13	13	13	5	8	8	8	7	3	6	6	6	6
	56	4	56	14	42	42	12	30	30	30	30	30	30
	2		2		2		2		2				
	1		1		1		1		1				
	2	1	2		2		2		2				
	1		1		1		1		1				
	1		1		1		1		1				
	1		1		1		1		1				
	1		1		1		1		1				
	1		1		1		1		1				
	40	10	30		30		30		18		18		18
1	9	2	8	1	7	1	6	1	5	1	4	1	4
	2		2		2		2		2		2		2
	2		2		2		2		2		2		2
	1		1		1		1		1		1		1
	1		1		1		1		1		1		1

An Abstract of Stores Expended.

	Whole charge	August		Septemb.		Octob.	
		Expended	Remains	Expended	Remains	Expended	Remains
Cordage Inch							
Cable 15 $\frac{1}{2}$		6 00	6	1	5	1	4
Do. 11.		1 00	1	00	1		1
Do. 8.		1 00	1	00	1		1
Cablets 5.		1 00	1	00	1		1
Do. 3 $\frac{1}{2}$		1 00	1	00	1		1
fa.							
Haulers 6 $\frac{1}{2}$		1 10 00	1 10		1 13	30	80
Do. 6		2 10 17	203		203	52	151
Do. 5.		1 90 00	190		190	64	126
Coyle of 4 $\frac{1}{2}$		3 00 00	300	54	246	00	246
Do. 3 $\frac{1}{2}$		2 55 89	156	65	100	00	100
Do. 3		3 30	334	00	330	49	281
	$\frac{1}{2}$	7 80	116 764	64	700	86	614
	2	6 50	157 593	40	553	00	553
	1 $\frac{1}{2}$	4 60	30 430	90	340	95	245
		7 20	00 720	300	420	00	420
Span		3 00	100 200	100	100	100	00
Viol		1	0	1	0	1	00
Main-Tack							
fa.							
Junk		65	15	40	10	50	00 30
Single		6	00	5	1	5	00 5
Blocks	of 18 Inch	1	5	7	00	7	1 6
	Do. 16	13	1	12	4	8	0 8
	Do. 10	16	3	13	1	12	4 8
	Do. 7	12	00	12	3	5	5 4
	Do. 6.	6	1	5	0	5	00 5

Nove.		Dec.		Janu.		Febru.		March		April.		May.	
Expendd	Remains	Expendd	Remains	Expendd	Remains	Expendd	Remains	Expendd	Remains	Expendd	Remains	Expendd	Remains
00	4	4	4	4	4	4	4	4	4	4	4	4	4
	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1										
	1												
	80	00	80	15	65	65	65	65	10	55	55	55	55
	151	40	111	111	28	283	83	20	63	63	63	63	63
4	84	84	30	34	34	16	18	18	18	14	4	4	4
	246	55	117	187	187	87	100	100	100	2	16	12	4
4	60	31	20	29	29	11	18	2	16	12	4	4	4
	281	64	217	217	38	179	60	115	119	100	19	19	19
20	594	594	594	94	500	28	472	2	470	470	470	470	470
70	483	69	414	30	384	380	24	364	64	300	100	200	200
40	205	16	189	185	80	109	75	34	12	22	22	22	22
100	320	55	265	65	200	200	20	180	180				
00	1	1	1	1	1	1	1	1	1	1	1	1	1
00	30	15	15	15	3	12	12	6	6	6	6	6	6
1	4	4	4	4	4	4	4	4	4	4	4	4	4
	6	1	5	1	4	1	3	2	2	2	2	2	2
	8	8	8	1	7	3	4	3	3	3	3	3	3
	8	8	8	1	1	1	1	1	1	1	1	1	1
	4	4	4	3	1	1	1	1	1	1	1	1	1
1	4	1	3	1	2	2	2	2	2	2	2	2	2

*An Abstract of
Stores Expended.*

	Inch	Whole Charge	Aug.		Sept.		Octob.	
			Expended	Remains	Expended	Remains	Expended	Remains
Snatch of	16	2	00	2	2	1	1	
Double of	16	3	1	2	2	2		2
Double of	26	2	00	2	2	2		2
Top. Iron-bound.	16	2	1	1	1	1		
Top Tacle	26	2		2	2			2
Viol of	36	2		2	2			2
Wine Tackle double		1		1	1			1
Do. Treble		1		1	1			1
Boats {	Long	1						
	Pinnance	1						
	Barge	1						
	Skiff	1						
Boat-hooks, Spars		4		4	4	1		3
Bowls		3		3	3			3
Brooms								
Buckets		12	3	9	9	1		8
Buoys {	Can	3		3				
	Wood	1		1	1	1		2
Commanders		2		2	2			2
Fids for Splicing		3	1	2	1	1		
Hand-Spikes		10	2	14	14	4		10
Oars {	Long-boat	30		30	5	7		27
	Pinnace	20		20		20	4	16
	Barge	20		20		19		19
	Skiff	1	1	15	1	4	1	13
Runlets for Oil				1		1		1

Nov.		Dec.		Jann.		Febr.		March		April.		May.	
Remains.	Expended	Remains.	Expended	Remains.	Expended	Remains.	Expended	Remains.	Expended	Remains.	Expended	Remains.	Expended
1	1	2	2	1	1	2	1	1	1	2	1	2	1
3	3	3	3	1	1	2	2	1	1	1	1	2	2
8	2	8	2	7	2	6	2	6	2	4	2	4	2
1	2	1	2	1	2	1	1	1	1	1	1	1	1
16	16	16	16	14	14	13	14	11	11	11	11	10	10
2	1	1	1	2	1	2	1	14	11	3	2	2	2
1	1	1	1	1	1	1	1	8	8	3	2	2	2

*An Abstract of
Stores Expended.*

	Whole Charges	August		Sept.		Octob.	
		Expended	Remains	Expended	Remains	Expended	Remains
Scoops	2 00	2 00		2	1	1	
Serving Mallets	3 00	3		3		3	
Balast Shovels	24 00	24		24		24	
Theales							
	pr.						
Buntings	100 86	14		14		14	
Fish Gigs	6 00	6		6	1	5	
Harping Irons	6 1	5		5		5	
Needles { Boltrop Sail Pots	8	8		8		7	
	56 15	41		41		41	
	1	1		1		1	
Puttock Plats	9	9		9		9	
Iron { Scrapers Spindles Spits Thimbles	18 1	17		17	2	15	
	3	3		3		3	
	2	2		2		2	
	48 5	43		43		43	
Hand Lanthorns							
Leads { Deepsea Hand	2	2		2		2	
	3	8		3		3	
Leather Buckets	8	8		8		6	
Hose	1	1		1		1	
Oil	1.						
Rosin	52 8	44	9	35 50		35	
Tallow	200 50	150		150		100	
Tar-Barrels	4 1	3	1	2	1	2	
Balast-Basket	10 2	8		8		7	
Thrums	8	8	4	4	4		

Nov.	Dec.	Janu.	Feb.	Mar.	April	May	
Expended	Remains	Expended	Remains	Expended	Remains	Expended	Remains
1	3	2	1	1	1	1	1
00	21	21	3	18	5	13	1
3	14	8	4	4	4	4	3
	5	5	2	3	3	3	1
1	4	4	3	3	3	3	1
	7	6	5	4	1	2	1
	41	33	6	17	1	18	18
	1	1	1	1	1	1	1
1	8	8	7	6	6	6	16
	15	15	1	14	24	14	14
	3	3	3	3	3	3	3
	2	2	2	2	2	2	2
	43	41	4	37	33	10	23
	2	2	1	1	1	1	1
	3	2	2	1	1	1	1
	6	5	4	3	1	1	1
	1	1	1	1	1	1	1
	25	20	20	11	11	11	11
100	28	72	9	59	28	20	3
	1	1	59	1	31	8	3
	7	5	1	4	4	4	4

An Abstract of Stores Expended.

		Whole Charge	Aug.	Sept.	Octob.	
		Expended	Remains	Expended	Remains	Expended
Sails.						
Sprit-sail	{ Courfes	2	2	2	2	
	{ Top-sail	2	2	2	2	
Fore	{ Courfes	3	3	3	4	
	{ Bonnets	00				
	{ Top-sails	3	3	3	3	
	{ Top-gal.-sail	2	2	2	2	
Main	{ Courfes	3	3	3	3	
	{ Bonnets	00				
	{ Top-sails	3	3	3	3	
Mizen	{ Top-gall.-sail	2	2	2	2	
	{ Courfes	2	2	2	2	
	{ Top-sails	2	2	2	2	
II. Stays	{ Main	1	1	1	1	
	{ Mizzen	1	1	1	1	
	{ Main-top	1	1	1	1	
	{ Fore-top	1	1	1	1	
Shivers	{ Brass	2	2	2	2	
	{ Iron	2	2	2	2	
Grindstone		1	1	1	1	
Tine Trucks		4	4	4	4	
Wood		00				
Breckoes Ir. Bd.		12	11	10	9	
Dead Eyes		16	14	14	11	
Cat-block Ir. Bd.		200	2	200	2	
Do. Hooks		203	2	200	2	

Nov.	Dec.	Jan.	Febr.	Mar.	April	May
Remains Expended	Remains Expended	Remains Expended	Remains Expended	Remains Expended	Remains Expended	Remains Expended
1 00	1 00	1 00	1 00	1 00	1 00	1 00
00	2 00	2 00	2 1			
00	3	2 00	2 00	2 00	2 00	2 00
1	2	2 1 00				
00	2 00	1 00	2 00	2 1	2 00	1 1 00
00	3 00	2 00	2 00	2 00	2 1	1 1 00
	1					
00	3	3 1	2 1	1 00	1 00	1 00
00	2 00	1 00	1 00	1 00	1 00	1 00
00	2 1	2 00	2 00	1 00	1 00	1 00
06	2 00	2 00	2 00	2 1	1 00	1 00
00	1 00	1 00	1 00	1 00	1 00	1 00
00	1 00	1 00	1 00	1 00	1 00	1 00
00	1 00	1 00	1 00	1 00	1 00	1 00
00	00	1 00	1 00	1 00	1 00	1 00
00	1 00	2 00	2 00	2 1	2 1	1 00
00	2 00	2 00	2 1	1 00	1 00	1 1 00
00	1 00	1 00	1 00	1 00	1 00	1 00
01	3 00	3 00	3 1	2 00	2 00	1 2 1
1	8 1	1	6 1	1	4 1	3 1 2
00	11 3	4	4 00	4 00	4 00	4 4 00
00	2 1	00	2 00	2 00	2 1	1 00
00	2 00	1 00				

Directions for making of Masts and Yards according to Proportion.

For the Main-mast $\frac{3}{4}$ of the Length of the Keels, and the Breadth of the Beam is the Length of it.

But for the Thickness of Masts this is a true Proportion, that for every 3 Foot in Length, they should be 1 Inch thick, in the Partners $\frac{7}{8}$ Parts of an Inch, in or about the Middle, and $\frac{3}{4}$ at the Head.

Main-top-mast must be $\frac{5}{8}$ parts of the Length of the Main-mast, and $\frac{1}{4}$ for Thickness.

Main-top-gallant-mast $\frac{3}{4}$ the Length of the Main-mast, Fore-top-gallant-mast proportionable.

The Fore-mast must be for its Length $\frac{7}{8}$ parts of the Main-mast, and the Thickness proportionable.

The Mizen-mast is $\frac{4}{5}$ parts of the Length of the Fore-mast, if it steps in the Hold, and the Mizen-mast proportionable.

For Yards.

The Main-yard must be in length $\frac{5}{8}$ parts of the Length of the Main-mast, and for every 3 Foot in length, 1 Inch thick in the Slings.

The Fore-yard must be $\frac{5}{8}$ parts of the Main-yard in Length, Thickness proportionable.

The Mizzen-yard must be a Medium betwixt both, and for every 6 Foot in Length, it must be 1 Inch thick in the Slings.

Main-

Main-top-fail-yard $\frac{4}{7}$ parts of the Length of the main-yard.

The Fore-top-fail-yard in like Proportion to the Fore-yard.

Sprit-fail-yard $\frac{3}{8}$ of the Length of the Main-yard, and for Thickness as before.

Cross-jack-yard, $\frac{2}{3}$ of the Length of the Main-yard, and as for Thickness the same Proportion with the Miffen-yard in the Slings.

Sprit-fail, Top-fail, and Mizzen-top-fail, Yards $\frac{3}{4}$ parts of the Main-yard in Length, or for the Mizzen-top-fail-yards length $\frac{1}{2}$ for the Main-yard.

Main-top-gallant-yard $\frac{3}{4}$ parts of the Main-yard is the length of it, and the Fore-top-gallant-yard hath the same Proportion to the Fore-yard.

For any Yards.

The Thickness of the Slings is the same with the first Quarter Yard, $\frac{2}{3}$ at the next half Quarter Yard, and $\frac{1}{3}$ at the Yard Arm, and this is a true Proportion of all Yards, except the Mizzen Yard, whose Dimensions is as followeth, *viz.* $\frac{1}{2}$ parts of the Thickness in the Slings, is the Thickness of the first lower Quarter, and $\frac{2}{3}$ at the lower End, and $\frac{3}{4}$ parts is the Thickness at the upper Quarter, and $\frac{1}{4}$ at the upper End, and for the Mizzen-mast $\frac{2}{3}$ parts of the Thickness in the Partners, is the Thickness in the Middle, $\frac{1}{2}$ under the Hooes, $\frac{2}{3}$ at the Head, and $\frac{1}{4}$ in the Step.

*A Proper and Easy Rule for finding the Length of
Masts.*

Note, as I have said before, That $\frac{2}{3}$ of the Length of the Keel, and the Breadth of the Beam is the Length of the Main-mast. Therefore I multiply the Length of the Keel by 2, and the Product I divide by 3, and to what comes in the Quotient I add the Breadth of the Beam, and the Sum of these two Numbers, when added, is the Length of the Main-mast.

Example.

Suppose a Ship to be 105 Foot by the Keel, and 32 Foot by the Beam, and the Length of her Main-mast is required,

105

2

210 $\times \frac{2}{3}$ (70 $\frac{2}{3}$ of the length of the Keel.

— 32 (32 - Breadth of the Beam.

102 Feet the length of the
— Main-mast.

Suppose

Suppose a Ship to be 75 Foot by the Keel,
and 29 Foot by the Beam. I would know
the Length of her Main-mast,

75

2

———— 150 (50 Foot $\frac{2}{3}$ parts of the Keel.

50 33 (29 Foot breadth of Beam.

———— 79 Foot. length of the
———— Main-mast.

For finding the Thickness of Masts.

I have told already, how that Masts should
for every 3 Foot in length be 1 Inch thick in
the Partners, $\frac{2}{3}$ parts of an Inch in the Mid-
dle, and $\frac{3}{4}$ at the Head, therefore I divide
the length of the Mast by 3, because 3 Foot
of the Mast in length requires 1 Inch in thick-
ness, and the Quotient of the Division is the
thickness of the Mast in Inches in the Part-
ners. Then because the $\frac{2}{3}$ parts of the thick-
ness of the Mast in the Partners is the thick-
ness of the Masts in the Middle, I multiply,
the Inches of the Diameter of the Mast found
in the Partners by 7, and the Product I di-
vide by 8, and the Quotient of that Division
is the thickness in Inches that the Mast should
be in Diameter in the Middle; then $\frac{3}{4}$ of an
Inch at the Head being the Proportion for
1 Inch in the Partners, therefore I multiply
the Inches of the Diameter of the Mast in
the Partners by 3, and that Product I divide
by 4, and the Quotient of that Division is
the

the thickness in Inches that the Mast should be at the Head; and by this and the foregoing Rules, you may find the Lengths, and the Thickness either of Masts or Yards, whether in great or small Ships, according to the truest Proportion.

Example.

Suppose a Mast to be 102 Foot in length, and it is required how thick this Mast ought to be according to Proportion?

$\times$
 $\times 02$ (34 Inches thick in the Partners.
 33

34
 $7 \times 7(6$

238 $238(29\frac{6}{8}$ parts in the Middle.
 88

34
 3×2
 182 $25\frac{1}{2}$ Inches at the Head.
 44

Example

Example.

Suppose a Mast to be 79 Foot in length, .
and you would know how thick it must be.

x (1
79 (26 $\frac{1}{3}$ Inches thick in the Partners,
33

26

3 3 (2
— 75 (19 $\frac{2}{3}$ parts of an Inch at the
78 44 Head,
—

26

7 2 (6
— 128 (22 $\frac{6}{8}$ for the middle.
182 88
—

*To find the Lengths and Thickness of Masts and Yards
by the Pen.*

We shall begin with the Main-mast of a Ship, whose length of Keel is 73 Foot, breadth of the Beam 28.5 Foot, the depth of the Hold 12 Foot.

The only Rule to find the length of the Main-mast, is to add the breadth of the Beam

Beam, and the depth of the Hold together, and divide the Product by 1.5, and the Quotient is the Yards in length the Main-mast of the the Ship must be.

Example.

The Breadth of the Beam	28.5
The Depth of the Hold	12.0

$$\begin{array}{r}
 1.5 \overline{) 40.5} \quad (27 \\
 \underline{105} \\
 000
 \end{array}$$

The length of the Main-mast sought is 27 Yards, or 81 Foot.

Those that are not very expert at Division, may make use of the following Multiplicator, which will perform the same as the Division does, and will be a great deal easier for the Learner, if he do but observe to prick off the Decimals to the Right Hand, as is directed in the foregoing Work.

Example.

The Sum of the Breadth and Depth is 40.5, the which I multiply by the proper Multiplicator .6666, and the Product is 26.99730, which is 26 Yards, and 99 hundredth Parts of a Yard, which wants not one Second to make it 28 Yards, equal to the former Work.

To find the thickness of the foregoing Mast, or any other Mast of the Ship, you are to take the length of the Mast mentioned in the foregoing Table, and say by the Rule of Proportion. If 84 give 28 (as in the Table) what will 81 give ?

(65)

$$\begin{array}{r} 84 \quad 28 \quad 91 \\ \hline 28 \\ 224 \\ \hline 2268 \quad (27 \text{ Inches} \\ 588 \\ 000 \end{array}$$

Here we find the Thickness of the Main-mast of the propounded Ship to be 27 Inches; how to find the Thickness or Length of the other Masts of the same Ship.

If for the Thickness of any of the Masts, you must work by the foregoing Rule, taking out the length of the Mast you require from the foregoing Table; and as the length there requires so much, what will the length found require?

You must find your Lengths of the several Masts and Yards by the Rule before directed.

Suppose I was to find the Length of the Fore-mast, having the length of the Main-mast, I multiply the length of the Main-mast by 8, and divide the Product by 9, and the Quotient is the length of the Fore-mast required.

As for Example: The length of my Main-mast is 81 Foot, the which I multiply by 8, and divide by 9, and the Quotient is 72, the length of the Fore-mast sought.

Now if you would have the length of the Mizzen-mast, being that it is $\frac{2}{3}$ of the length of

of the Fore-mast, you must multiply the length of the Fore-mast by 3, and divide the Product by 4, and the Quotient is the length of the Mizzen-mast; the Fore-yard is in Proportion to the Main-yard, as the Fore-mast is in Proportion to the Main-mast.

Thus we have inserted the most material Things as to a Ship's Rigging; but because the Way here inserted will be troublesome and tedious; unless to some Artists who take Pleasure therein, we shall set a plain and easy Way, by which any Ship may be Rigged with a great deal of Ease; and shall be as follows.

Rigging for the Fore-mast.

$\frac{2}{3}$ of the Length of the Mast is the first length of the Shrouds; and afterward give Allowance as they rise upon the Head of the Mast.

$\frac{1}{2}$ the length of the Shroud is the length of the Pennants; if double, $\frac{2}{3}$.

The length of the Mast is the length of the Stay.

Thrice the length of the Shrouds is the length of the Lifts.

Three times the length of the Shrouds is the length of the Clugarnets.

Twice the length of the Mast from the Deck to the Cross-trees, is the length of the Bunt-lines.

Legs, Horses, 1 length and $\frac{1}{2}$ of the Yard.

Twice the length of the Main-yard is the length of the Leechlines.

Twice the length of the Main-yard for the Braces. Parrel-

Parrel-Rope $\frac{3}{4}$ of the Yard.

Two and a half the length of the Main-yard for the Fore-sheets.

Four times the length of the Mast is the length of the Jeers.

Twice the length of the Main-yard is the length of the Buntlines; and the same length for the Topsail Sheet.

Rigging for the Main-mast.

The length of the Shrouds is the length of the Pendants; if double, $\frac{3}{4}$ of the Shrouds. $\frac{3}{4}$ the length of the Mast, is the length of the Shrouds.

The length of the Mast, and $\frac{1}{2}$ part of the length of the Mast, is the length of the Stay.

Four times the length of the Mast, from the Deck to the Cross-trees, is the length of the Jeers; if fourfold Jeers, 5 times.

1 Length and $\frac{1}{2}$ of the Main-yard, is the length of the Studdin-sail Hallyards.

2 Lengths and $\frac{3}{4}$ of the Main-Mast is the length of the Stay-sail Hallyards.

Horses one length and $\frac{1}{4}$ of the Yard.

Parrel-ropes $\frac{3}{4}$ of the Yard.

Three times the length of the Main-Yard, is the length of the Lifts.

Twice and $\frac{1}{2}$ the length of the main-yard is the length of the Braces.

The length of the Main-yard is the length of the Bowlines.

Twice $\frac{1}{2}$ the length of the Main-yard is the length of the Clugarnet.

Buntlines must be 4 times the length of the Mast for Falls and Legs.

Twice

Twice the length of the Main-yard, is the length of the Leechlines.

The length of the Main-yard, is the length of the Tacks; Runners must be the same length.

Twice $\frac{1}{2}$ the length of the Main-yard, is the length of the Sheets.

Twice the length of the Mast is the length of the Knaveline.

Twice the length of the Main-yard is the length of the Topsail Sheets.

Twice the length of the Mast, is the length of the Slabline.

Rigging for the Mixon-Mast.

Four times the length of the Mast, from the Deck to the Cross-trees, is the length of the Hallyards.

Twice the length of the Mast, from the Deck to the Cross-trees, is the length of the Brayles.

1 length and $\frac{1}{2}$ of the Yard is the length of the Sheet.

The Tacks about Three Fathoms.

The length of the Mast is the length of the Shrouds.

$\frac{1}{2}$ of the Shrouds is the length of the Pen-nants.

The length of the Main-yard, is the length of the Burton Fall.

The length of the Mast is the length of the Stay, wanting the length of the Head of the Mast, if it steps in the Hold.

The length of the Cross Jack Yard, is the length of the Bowlines.

Rigging

Rigging for the Fore Top Mast.

One third the length of the Shrouds, is the length of the Pennants.

Once the length of the Mast is the length of the Shrouds.

Once the length of the Fore-yard is the length of the Burtons.

Pendants of the Burtons half the length of the Top-sail Yard; and Falls for them twice the length of the Yard.

Twice and half the length of the Fore-yard is the length of the Lifts.

Thrice the length of the Yard is the length of the Cluline.

Twice and an half the length of the Fore-yard is the length of the Braces.

Twice the length of the Fore-yard is the length of the Bowlines.

Twice the length of the Fore-top-sail Yard is the length of the Leechlines.

Once the length of the Top-mast is the length of the Tye.

Once and $\frac{1}{2}$ the length of the Fore-yard is the length of the Runners.

Thrice the length of the Fore-yard is the length of the Hallyards.

Once and one third the length of the Mast is the length of the Stay.

Once and a half the length of the Fore-yard is the length of the Back-stays.

Twice the length of the Fore-yard is the length of the Buntlines.

Rigging

Rigging for the Main Top Mast.

Half the length of the Shrouds is the length of the Pennants.

Once the Length of the Mast is the length of the Shrouds.

Once and a half the length of the Mast is the length of the Stay.

[Twice and a half the length of the Main-yard is the length of the Braces.

One third of the length of the Main-yard is the length of the Burtons ; Pendants of the Burtons half the length of the Top-sail-yard, and Falls for Burtons is two lengths and one third of the Main-yard.

Twice and half the length of the Main-yard is the length of the Lifts.

Twice the length of the Main-yard is the length of the Buntlines.

Thrice the length of the Main-yard is the length of the Clulines.

Once the length of the Top-mast Shroud is the length of the Tye.

Once the length of the Main-yard is the length of the Runners.

Three times the length of the Main-yard is the length of the Hallyards.

Two times the length of the Top-sail-yard is the length of the Leechlines.

Twice the length from the Deck to the Hounds is the length of the Buntlines.

Once and one fourth the length of the Main Shrouds is the length of the Top-rope.

Four

Four times the length of the Main-mast is the length of the Top-rope Fall.

One third of the Top-sail-yard is the length of the Pennants for Braces.

Once and a half the length of the Yard is the length of the Back-stays.

Rigging for the Mizon-Top-Mast.

One third of the Shrouds the length of the Pendants.

The length of the Mast, from the Cross-trees to the Heel, the length of the Shrouds.

Once and half the length of the Mast is the length of the Stay.

Three times the length of the Mast is the length of the Lifts.

Once and one third the length of the Mizon-Yard is the length of the Braces.

Once and a half the length of the Cross-jack-yard is the length of the Bowlines.

Twice and a half the length of the Cross-jack-yard is the length of the Cross-jack-Braces ; if double, two lengths and a half of the Mizon-yard.

Twice and a half the length of the Cross-jack-yard is the length of the Sheets.

Twice and a half the length of the Cross-jack-yard is the length of the Clulines.

Once and two thirds the length of the Mizon-yard is the length of the Hallyards.

Once the length of the Top-mast, from the Cross-trees to the Heel, is the length of the Tye.

Rigging for the Fore-top Gallant.

Once the length of the Mast, from the Cross-trees to the Feed-hole, is the length of the Shrouds.

Once and a half the length of the Fore Yard is the length of the Stay.

Three times the length of the Mast is the length of the Lifts.

Twice and a half the length of the Fore Yard is the length of the Braces,

Twice and a half the length of the Fore Yard is the length of the Bowlines.

Twice and a half the length of the Fore Yard is the length of the Hallyards.

Rigging for the Main-top-gallant-Mast.

Once the length of the Mast, from the Cross-trees to the Heel, is the length of the Shrouds.

Two lengths and one fourth of the Top-mast Shrouds is the length of the Stay.

Thrice the length of the Top-gallant Mast is the length of the Lifts.

Once the length of the Yard is the length of the Parel-Rope.

Twice the length of the Main Yard is the length of the Braces

Twice the length of the Main Yard is the length of the Bowlines.

The length of the Mast is the length of the Tye.

Twice and one fourth the length of the Main Yard is the length of the Hallyards ; if single, one length, and two thirds of the Main Yard.

Twice

Twice the length of the Main Yard is the length of the Top-Rope.

For the Spritsail Top Mast.

The length of the Mast, from the Heel to the Cross-trees, is the length of the Shrouds.

Thrice the length of the Mast is the length of the Hallyards.

Thrice the length of the Mast is the length of the Lifts.

Twice the length of the Sprit-sail Yard is the length of the Clulines.

Twice the length of the Sprit-sail Yard is the length of the Braces.

Twice the length of the Top-sail Yard is the length of the Cranelines.

The Pendant of the Craneline is half of the Mast.

Once the length of the Mast is the length of the Tye.

How to Work a SHIP, at Sea in the proper Sea Phrases, according to the Best Authors.

The Wind is Fair.

THE Wind is fair, tho' But little; it comes well, as if it would stand, therefore up a Hand and loose your Fore-top-sail in the Top, that the Ship may see we will fail; bring Cable to the Capston, heave up
D your

your Anchor, loose your Fore-sail in the
 Brails, put abroad our Colours, loose the Mi-
 zon in the Brails ; is all our Men on Board :
 Those that be on Shore may have a Tow,
 and be blest with a Ruther, for we will stay
 for no Man. Come my Hearts, heave up
 your Anchor, that we may have a good
 Prize ; come, who says *Amen* ? One and all :
 Oh brave Hearts ! the Anchor is a Peck ;
 heave out your Fore-top-sail, heave out
 Main-top-sail, hawl home the Top-sail-
 sheets ; the Anchor is away, let fall your
 Fore-sail, hoise up your Fore-top-sail, hoise
 up your Main-top sail, up and loose the
 Main-sail, and set him ; loose Sprit-sail, and
 Sprit-sail-top-sail : A brave Gale, bring the
 Fore-tack to the Cat-head, and trim our Sails
 quartering ; hoise up our Small-sails, heave
 out the Mizon-top-sail, and set him ; now
 we are clear, and the Wind like to stand,
 hoise in our Boats before it is too much Sea ;
 aboard Main-tack, aboard Fore-tack, a Lee
 the Helm handsomely, and bring her to
 easily, that she may not stay : Brace the
 Fore-sail and Fore-top-sail to the Mast, and
 hawl up the Lee Bowlines, that the *Ship* may
 not stay ; pass Ropes for the Boats on the
 Lee side, and be ready to clap on your
 Tackle, and hoise them in ; stow them fast,
 and let go the Lee Bowline of the Fore-sail
 and Weather Braces, Right your Helm,
 hawl aft the Fore-sheet, trim the Sails
 quarteting as before ; loose Sprit-sail, and
 hawl aft the Sheets, and hoise up the Sprit-
 sail-top-

fail-top-fail, and other small Sails; let the Main-stay-fail, and Fore-top-fail, Stay-fail and Mizon-stay-fail, and Main-top-fail, Stay-fail, and lace on your Bonnets, that we may make the most of our way to our Station; clear your Ropes: Come, get up your Steering Sails, the Lee steering Sails of Mainfail, and Maintopfail; Foresail, and Foretopfail only, for they will fit fairest, and draw most.

Thus you have a brave Ship under all her Sails and Canvas, in her swiftest way of Sailing upon the Sea: Now let us have her right before the Wind.

Right afore the Wind, and a fresh Gale.

The Wind is vered right aft, take in your Fore and Fore-top Sail, Steering Sail, and Foretop Sail, and Main and Main-top Sail, Stay Sails, for they are becalmed by the After Sails, and will only beat out. The Wind blows a fresh Gale, round aft the Main Sheets and Fore Sheets; square your Yards; take in your Main and Main-top-fail, Steering-fails unlace your Bonnets, take in your Main and Foretopgallant Sails: in Sprit Sail, and Mizon-top Sail; let go the Sheets; hawl home your Clulines, cast off Top-gallant-Bowlines. *Thus you have all the small Sails in, and furled when it blows too hard to bear them.*

The Wind wcereth forward and scanteth.

The Wind scanteth, vere out some of your Fore and Main Sheets, and Sprit-fail Sheets.

and let go your Whether-Braces ; top your Sprit-sail Yard : The Wind still veereth forward, get aboard the Fore and Main Tack ; cast off your Weather Braces : The Sails are in the Wind, hawl off Main and Fore Sheets : The Wind is sharp, hawl forward the Main Bowline, and Fore Bowline, and hawl up the Main Top-sail, and Fore Top-sail Bowlines, and set in your Lee Braces, and keep her as near as she will lie. *Thus have you all the Sails trimmed sharp, and by a Wind.*

The Wind blows Frisking.

The Wind blows hard, settle our Fore and Main Top-sails two Thirds of the Mast down ; it is more Wind, come hawl down both Top-sails close ; come, stand by, take in your Top-sails ; let go the Top-sail Bowlines, and Lee Braces : let go the Lee Sheets, set in your Weather Braces, spill the Sails, hawl home the Top-sail Clulines, square the Yard. *Now the Top-sails are furled, and you have the Ship in all her Low-Sails or Courses.*

It bloweth a Storm.

It is like to overblow, take in your Sprit-sail, stand by to hand the Fore-sail ; cast off the Top-sail Sheets, Chugarnets, Lee-chlines, Buntlines ; stand by the Sheet and Brace ; lower the Yard, and furl the Sail, here is like to be very much Wind ; see that your Main Hallyards be clear, and all the rest of your Geer, clear and cast off, (is all clear ?) lower the Main-yard, hawl down upon your down-

down-hawl; now the Yard is down, hawl up the Clugarnets, Lifts, Leechlines and Buntlines, and furl the Sail fast, and fasten the Yards that they may not traverse and gall. Thus have you the Ship a Try under a Mizon.

A very hollow-grawn Sea.

We make Foul Weather, look the Guns be all fast; come, hand the Mizon, the Ship lies very broad off; it is better Spooning before the Sea, than Trying or Halling; go, reef the Fore-sail, and let him: hawl aft the Fore-sheet; the Helm is hard a Weather, mind at Helm what is said to you carefully: The Ship wears bravely, steady, she is before it; belay the Fore-down-hall; it is done: The Sail is split, go, hawl down the Yards: and get the Sail into the Ship, and unbind all the Things clear of it: Star-board, hard up, right your Helm; Port, Port hard; more Hands, he cannot put up the Helm; a very fierce Storm, the Sea breaks strange and dangerous; stand by to hawl off upon the Lanyard of the Whip-staff, and help the Man at Helm, and mind what is said to you; shall we get down our Top-mast? No; let all stand, the scuds before the Sea very well; the Top-mast being aloft, the Ship is the whollomer, and maketh better Way thro' the Sea, seeing we have Sea-room. Thus you see the Ship handled in fair Weather and foul, by and large; now let us see how we can turn to Windward.

The Storm is over, let us turn to Windward.

The Storm is over, set Fore-sail and Main-sail; bring our Ship to; set the Mizzen, the Main-top-sail, and the Fore-top-sail; our Course is E. S. E. the Wind is at South; get the Starboard Tacks aboard, cast off your Weather Braces and Lifts, set in the Lee Braces, and hawl forward by the Weather Bowlines, and hawl them taught, and belay them, and hawl over the Mizzen Tack to Windward; keep her full, and by as near as she will lie; How wind you? East; a squade Wind; no near, hard no near, the Wind vereth to the Eastward still: How wind you? N. E. hard no near, the Wind is right in your Teeth; no near still. How wind you? N. W. by N. the Wind will be Northerly, make ready to go about; we shall lie our Course the other Way, no near; give the Ship Way, that she may stay; ready, ready, a Lee the Helm; vere out the Fore-sheet, let go Fore-top Bowline; cast off the Lee Braces of your Fore-sail, and Fore-top Sail; brace in upon your Weather Braces: The Fore-sails is a back Stays; hawl Main-Sail, hawl; let rise the Main-Tack, cast off your Larboard Braces; let go Main Bowline, and Main-top-sail Bowline; brace about the Yard; hawl forward by the Larboard Bowlines: get the Main-Tack close down, in the Chefs-trees; the Sheet is close aft hawl off all; hawl, get to Fore-Tack

Tack; let go Fore-Bowline, and Fore-top-sail Bowline; hawl aft the Fore-sheet, hawl taught the Main-Bowline, the Main-top-sail Bowline; shift the Mizzen-tack, hawl taught Fore-Bowline, and Fore-top-sail Bowline; set in the Lee Braces fore and aft, keep her as near as she will lie; No near, How wind you? N. N. E. Thus, ware no more; no near, keep her fall; the Wind is at N. N. E. Thus, ware no more; How wind you? E. N. E. The Wind is at N. keep her away her Course, E. S. E. Cast off the Lee Braces, and Weather Bowlines, and set in your Weather Braces, vere out the Main-Sheet and Fore-Sheet, loose the Sprit-sail, and Top-sail, and Mizzen-top-sail, and Top-gallant-sails; hoise them up; the Wind veres aft still, let rise the Fore-tack; the Wind's quartering, hawl aft the Fore-Sheet, bring it down to the Cat-head with Pass-a-ree; steady in your Weather Braces, the Wind stands. *Thus you have the Ship as at first, steering under all her Canvas, Quarter-Winds. She hath been wrought in all manner of Weather, and all sorts of Wind, therefore we will draw to a Conclusion with a Man of War in Chase, and taking of her Prize.*

The Man of War in her Station.

NOW we are all in our Station, and a good Latitude, hand your Top-sails, and furl your Main-sail and Fore-sail, and brail up the Mizzen, and let her be at Hull untill Fortune appear within our Horizon.

Up aloft to the Top-mast-head, and look abroad ; young Men, look well to the Westward, if you can see any Ship that hath been nipt with the last Easterly Winds. *A Sail, a Sail.* Where ? *Fair by us ;* How stands She ? *To the Eastward, and is two Points upon her Weather Bow, and hath her Larboard Tacks aboard :* O then she lies close by a Wind ; we see her upon the Docks plainly ; a good Man to Helm ; up young Men, and loose the Fore-sail, Main-sail, and Mizon ; get the Larboard Tacks aboard ; heave out the Main-top-sail, and Fore-top-sail, and loose the Sprit-sail ; keep her as near as she will lie ; hawl aft the Sheets, and hawl up your Bowlines taught ; do you see your Chase ? *Yes :* How Wind you ? *E. N. E.* then the Wind is at N. hoise up your Top-sails as high as you can ; heave out Sprit-sail, Top-sail, and Mizon-top-sail ; hawl home the Sheets, young Men loose the Main-top-gallant-sail, and Fore-top-gallant-sail ; hawl home the Sheets, and hoise them up ; hoise up Main-stay-sail, and loose the Mizon-stay-sail, and loose the Main-top-sail, and Fore-top-sail, Stay-sails, and set them ; it blows a brave Chasing Gale ; the Ship makes brave Way thro' the Sea ; we raise her apace : if she keeps her Course, we shall be up with her in three Glasses ; no near, keep the Chase open with the Litch of the Fore-sail : So, thus, keep her thus ; come, aft all Hands, the Ship will steer the better when you sit all quiet by her small Sails, for she is too much by the Head ;

the

the Chase is a lusty brave Ship; so much the better, she hath the more Goods in her Hold: The Ship hath a great many Guns; it may be she is a Privateer. Port, the Chase is about; come, fetch her Wake, and we will be about after her; we Sail far better than she; we have her Wake; a Lee the Helm, veer out the Fore-sheet; every Man stand handsomely to his Business, and mind the Bowlines and Braces, Tacks and Sheets; hawl Main-sail, hawl; let go Main-bowline, Top-bowline, Top-gallant-bowline, hawl off all; hawl, shift the Helm; bring her to; hawl the Main-sheet and Fore-sheet close aft; set in the Lee-Braces, hawl taught the Bowlines; the Chase keeps close upon a Wind; keep her open under our Lee. Gunner, See that you have all Things in readiness, and that the Guns be clear, and that nothing pester our Decks. — Down with all Hammocks and Cabins that may hinder and hurt us. Gunner, Is all our Geer ready? Is there store of Cartrages ready filled? All manner of Shot at the Main-mast? Is there Rammers, Sponges, Ladles, Priming-Irons and Horns, Linstocks, Wads and Water, at there several Quarters sufficient for them? Be sure that none of our Guns be clog'd; and when we are in Fight be sure to load our Guns with Cross-Bar and Longrel; always observe to give Fire when the Word is given: See that there be Half-pikes and Javelins in readiness, and all our Small-shot well furnished, and all their Band-

daleers filled with Powder, and Shot in their Pouches ; see that our Murtherers and Stock-Fowlers have their Chambers filled with good Powder, and Bags of Small-shot, to load them, that if we should be laid aboard we might clear our Decks : Star-board ; the Chase pays away more Room ; Star-board hard, veer out some of the Main-sheet and Fore-sheet ; cast off the Larboard-Braces, steady, keep her thus, Well steered, the Chase goes away, Room, her Sheets are both aft, she is right before the Wind : Starboard hard ; let rise Main-tack ; hawl aft Main-sheet, hawl Fore-sheet ; we have a Stern Chase, but we shall be up with her presently, for we fetch upon her Hand-firing ; the Chase hauls up his Main-sail, and furls it ; she puts aboard her Waste-clothes ; she will fight us, come up young Men and furl our Main-sail sling our Main-yard, with the Chains in the Main-top, sling our Fore-yard, put abroad our Waste-cloths ; she will fight us before the Wind ; I see she is full of Men ; it is a hot Ship, but deep and foul ; come cheerly my Hearts, it is a Prize worth fighting for ; the Chase takes in her small Sails, up aloft and take in our Top-gallant-sails, Sprit-sail, and get the Yard alongst under the Bow-sprit ; she puts abroad her Colours ; they are White, *French* Colours ; no Force ; Boy, up and put abroad St. George's Colours in our Main-top ; step aft a Hand, and put abroad our Ancient ; call all Hands aloft. Come up aloft all Hands : They are all up Captain.

Gentlemen,

Gentlemen,

WE are here Imp'oyed and Maintained by His Majesty King GEORGE, and our Country, to do our Endeavours, to keep this Coast from Piracy and Robbers, and His Majesty's Enemies; and it is our Fortune to meet this Ship at this time: Therefore I desire you in His Majesty's Name, - and for the Sake of our Country, and the Honour of our English Nation, and Ourselves, and for every Man, to behave himself Couragcous, like Englishmen; and not to shew the least of a Coward, but to observe the Words of Command, and do his utmost Endeavour.: Into GOD's Hand we commit our Cause, and ourselves. So every Man to his Quarter, and shew his Courage, and GOD be with you.

She settles her Top-sails; we are within Shot, let all her Guns be loose in the Tackles, and the Ports be knockt open, that we may be ready to run out our Guns when the Word is given; Up Noise of Trampets, and hail our Prize: She answereth again with her Trumpet: Hold fast Gunner, do not fire till we hail them with our Voices; Port edge towards him; he fires his Broadside upon us: What chear my Hearts? Is all well betwixt Decks? *Yea, Yea, only she rack'd us through and through*; no Force; it is his turn next; but give no Fire until we are within Pistol-shot: Port, edge towards him; he plies his Small-shot; hold fast Gunner; Port right your Helm, we will run up his Side; Starboard a little, give Fire; Gunner, that's well done;
this

'his Broad-fire hath made their Deck thin,
 but the Small-shot at first did gawl us, clap
 in some Case-shot in the Guns you are now
 a loading, Brace the Fore-top-sail, that we
 m y not shoot a-head; he lies broad off to
 the Southward, to bring his other Broad-side
 to bear upon us: Starbord hard; get to Lar-
 board Foretack, trim your Top-sails, run out
 your Larboard Guns; he fires his Starboard
 Broadside upon us; he pours in his Small-
 shot; Starboard, give not Fire untill he fall
 off, that the Prize may receive our full
 Broadside steady; Port a little; give Fire
 Gunner; his Fore-mast is by the Board; this
 last Broadside hath done great Execution;
 cheerly my Mates, the Day will be ours;
 he is shot a-head; he bears up before the
 Wind to stop his Leaks; keep her well
 Steer'd, Port, Port hard, bear up before the
 Wind, that we may give him our Starboard
 Broadside; Gunner is there great store of
 Case-shot and Longrel in our Guns? *Yea,*
yea. Port, make ready to board him; have
 your Lashers clear, and able Men with
 them; edge towards him when you give
 Fire; bring your Guns to bear amongst his
 Men with the Case-shot; well Steered,
 we are close on Board; give Fire: Star-
 board, well done, Gunner; they lye Heads
 and Points Aboard the Chase; Come Aboard
 him bravely; enter, enter; are you latcht
 fast? *Yea, yea;* we will have him before we
 go here hence; cut down the Decks; ply
 your Hand-Grannadoes, and Stink-pots; he

cries out Quarter ; *Quarter for our Lives, and we will yield up Ship and Goods* : Good Quarter is granted, provided you lay down all your Arms ; open the Hatches, hawl down all your Sails, furl them ; loose the Latchings ; we will sheer off our Ship, and hoise out our Shallop ; if you offer to make any Sail, expect no Quarter for your Lives ; go with the Shallop, and send Aboard the Captain Lieutenant, and Master, and Matés, with as many more as the Shallop will carry.

So we will leave the *Man of War* to his Prize, and to secure his Prisoners.

An Explanation of the most usual Sea-Terms.

A

AFT or *A'ast*, Fromward the Forepart of the Ship, or towards the Stern, as the *Mast* hangs *ast* ; that is, towards the Stern.

How cheap ye for and ast ; that is, How fares all your Ship's Company ?

Am'n, a Word used by a Man of War to his Enemy, and signifies *Tied*.

Strike Anain ; that is, lower your Top-sails.

The Anchor is a Peak ; that is, the Anchor is right under ther Hawse, (or Hole) thro' which the Cable belonging to the Anchor runs out.

The Anchor is a Cock-Bell ; that is, hangs up and down by the Ship-side.

The Anchor is foul ; that is, the Cable is got about the Fluke.

An Awning, a Sail, or the like, supported by

by a Canopy over the Deck, to prevent the scorching Heat of the Sun in hot Climates.

B

To Bale, is to lade Water out of the Ship's Hold.

French the Ballast; divide or separate it.

The Ballast shoots; that is, runs over from the one Side to the other.

To bear with the Land, &c. to sail towards it.

To bear to; that is, to sail before or with the Wind, into a Harbour or Channel.

A Piece of Ordnance doth come to bear; that is, lies right with the Mark.

Bear up; a Term used in conding the Ship, when they would have her sail more before the Wind.

Bear up round, put her right before the Wind.

To Belag, to make fast any running Rope.

To bend a Cable, is to make it fast.

A Birth, a convenient Place to Moor a Ship in.

A Bight, any part of a Rope between the Ends.

The Buge, the breadth of the Place the Ship rests on when she is a-ground.

The Ship-Bilged; that is, has struck off some of her Timber on a Rock or Anchor, and springs a-Leak.

A Binnacle, that whercon the Compass stands.

A Bitter, a turn of a Cable about the Bits.

The Bits, two square Pieces of Timber, to which the Cables are fastned when the Ship rides at Anchor.

A *Bonnet*, an Addition of another Sail ; when they fasten it they say, *Lace on the Bonnet*, and when they take it off, *Shake off the Bonnet*.

A *Boom*, a long Pole used to spread out the Clew of the Scudding-sail, &c.

Board and Board, a Term used when two Ships come so near as to touch one another.

Board it up, is to turn to Windward.

To go Aboard, is to go into a Ship.

To break Bulk, is to open the Hold, and take Goods out thence.

C

To Chase, is to pursue another Ship, and the Ship so pursued is called the *Chase*.

Carreening, is bringing a Ship to lie down on one side while they Trim and Caulk the other.

Caulking, is driving of Oakham, Span-hair, and the like, into all the Seams of the Ship, to keep out Water.

To Cond or *Cun*, is to direct or guide ; and *to Cun a Ship*, is to direct the Person at Helm how to steer her : If the Ship go before the Wind, then he who *Cuns* the Ship uses these Terms to him at Helm, *Starboard*, *Larboard*, *Port*, *Helm* a *Mid-ships*, *Starboard*, is to put the Helm to the Starboard (or Right) side, to make the Ship go to the Larboard (or Left ;) for the Ship always sails contrary to the Helm. In keeping the Ship near the Wind, these Terms are used, *Loof* ; *keep your Loof* ; *fall not off* ; *veer no more* ; *keep her to* ; *touch the Wind* ;
have

have a care of the Lee Latch. To make her go more large, they say, *Ease the Helm*, no near; *bear up*; To keep her upon the same Point they use, *Steady*, or *as you go*, and the like.

The Ship goes Lasking, Quartering, Vecring, or *Large*, are Terms of the same Signification, viz. That she neither goes by a Wind, nor before a Wind, but betwixt both.

The Course, is that Point of the Compass on which the Ship sails; also the Sails are called Courses.

Cut the Sail; that is; unfurl it, and let it fall down.

D

Dead Water, the Eddy Water at the Stern of the Ship.

To *Disenbogue*, is to go out of the Mouth of a Gulf.

To *dispart*, is to find out the Difference of Diameters betwixt the Breech and Mouth of the Ordnance.

The Deck is aflush afore and aft; that is, laid from Stern to Stern, without any Falls or Risings.

E

End for End, a Term used when a Rope run all out of the Block, so that it is unreved.

F

A Fathom, a Measure containing six Feet.

A Fack, is one Circle of any Rope or Cable quoiled up round.

To Hand (or Furl) a Sail, is to wrap it up close together, and bind it with little Strings, called *Caskets*, fast to the *Yard*.

To Fish a Mast or Yard, is to fasten a Piece of Timber or Plank to the Mast or Yard to strengthen it; which Plank is called a *Fish*.

To lower or strike the Flag, is to pull it down upon the *Cap*, and in Fight is a Token of Yielding; but otherwise of great Respect.

To heave out the Flag, is to unwrap it from about the *Staff*.

Free the Boat or Ship, is to bale or Pump the Water out.

G

The Ship's Gage, is so many Foot as she sinks in the Water; or (which is as proper) so many Foot as she draws.

Weather Gage, is when one Ship has the Wind (or is to Weather) of another.

To Greave the Ship, is to bring her to lie aground, to burn off her old Filth.

The Ship Griper, that is, turns her Head to the Wind more than she should.

H

To hale, is the same as to pull.

To Hail a Ship, is to call her Company to know whither they are bound, and is done after this manner.

Hoa the Ship! Or only *Hoa!* To which they answer, *Hoa*. As also to salute another Ship with Trumpets, or the like, is called *Hailing*

Fresh

Fresh the Hawse, a Term used when that part of the Cable that lies in the Hawse is fretted or chafed, and they would have more Cable veered out. When two Cables that come thro' two several Hawses, are twisted, the untwisting of them is called, *Clearing the Hawse*; *Thwart the Hawse*, and *rides upon the Hawse*, are Terms used when a Ship lies *thwart* or *cross*, or with her Stern just *before* another Ship's *Hawse*. Note, That the *Hawse* are the Holes under the Head of the Ship, through which the Cables run when she lies at Anchor.

To Hitch, is to make fast.

The Ship Heels: that is, inclines more to one side than the other, as *she heels to Starboard*: that is, turns up her Larboard-side to lie down on the Starboard.

The Hold of a Ship, is that Part betwixt the Keelson and the Lower-Deck, where all Goods, Stores and Victuals do lie. *Rummidge the Hold*, is used for removing or clearing the Goods and Things in the Hold. *Stowing the Hold*, is when they take Goods into the Hold.

To Hoyse, is to hawl or lift up, as, *Hoyse the Water in*, *Hoyse up the Yards*.

Hulling, is when a Ship at Sea takes in her Sails.

L

The Ship labours: that is, roul and tumbles much.

Land-fall, is a Term used when we expect to see Land.

Land-

Land-locked, is when the Land lies round about us, so that no Point is open to the Sea.

Land-to, a Ship is said to lie *Land-to*, when she is at so great a Distance as only just to discern Land.

To Lash, is to bind.

To Launch, is to put out, as to *Launch a Ship*, is to put her off the Dock into the Water: but is sometimes likewise used in a Negative sense, as when a Yard is hoisted high enough, they usually cry aloud, *Launch her*, that is, hoise no more.

To lose the Land, is to lose sight of it.

The Lee-shoar, is that Shoar against which the Wind blows.

Have a care of the Lee-Latch, that is, take heed the Ship go not out too much the Lee-ward.

A Ship lies by the Lee: that is, it has all her Sails lying flat against the Masts and Shrouds.

M

Mizon-Sail hath several Words peculiar to it, as, *set the Mizon*: that is, *set the Mizon-sail*: *Change the Mizon*: that is, bring the Yard to the other side of the Mast: *Speak the Mizon*, that is, put the Yard right up and down the Mast: *Spell the Mizon*, that is, let go the Sheet, and peek it up.

To Moor a Ship, is to lay out her Anchor in such a manner as is most convenient for her to ride by safely.

N

Neap-tides, are the Tides when the Moon is in the second and last Quarter, and they are neither so high, nor so low, nor so swift, as the Spring-tides.

A Ship is beneaped, a Term used when the Water does not flow high enough to bring a Ship from off the Ground, or out of a Dock, or over a Bar.

O

Offward, is contrary to the Shoar.

The Ship stands for the Offling: that is, sails from the Shoar into the Sea.

Overset, is turning over.

P

To pay a *Seam*, is to lay hot Pitch and Tar on (after Calking) without Canvas.

To parcel a *Seam*, is (after the Seam is Caulked) to lay over it a narrow piece of Canvas, and pour thereon hot Pitch and Tar.

To ride a *Peek*, is when the Yards are so order'd that they seem to make St. *Andr.w's* Cross.

The Capstain purchase, apace; that is, draws in the Cable apace.

Q

Quarter-winds are when the Wind comes in Abast the Main-mast Shrouds, even with the Quarter.

A Quoil, is a Rope or Cable laid up round, one Fack over another, and the Fack is called *Quoiling*.

R.

A Reach, is the Distance between any two Points of Land that lye in the Right Line one from another.

To *Reeve*, is to put a Rope thro' a Block; and to pull a Rope out of a Block is call'd *unreeving* the Rope.

To *Ride*, when a Ship's Anchors holds her fast, so that she does not drive with the Wind or Tide, she is said to *ride at Anchor*.

To *Ride athwart*, is to ride with the Ship's Side to the Tide.

To *Ride betwixt Wind and Tide*, is when the Wind and Tide are contrary, and have equal strength.

To *Ride Hawse, fall*, is when in a rough Sea the Water breaks into the Hawses.

A Road, is any Place near the Land, where Ships may Ride at Anchor; and a Ship riding there is call'd a *Roader*.

Rowse in; that is, (hawl in) proper only to the Cable or Hawser, and is us'd when the Cable or Hawser is slack, to make it taught or strait.

S

To *Sarve a Rope*, is to Winde something about it to keep it from fretting out.

To *Seaze*, is to make fast or bind.

The *Ship Sles*; that is, when on a sudden she

fire lies down on her Side, and tumbles from one side to another.

The *Ship fends* ; that is, her Head (or Stern) falls deep in the Trough (or Hollow) of the Sea.

To *Settle a Deck* : is to lay it lower.

The *Ship is sewed* : that is, the Water is gone from her.

The *Ship Shares* : that is goes in and out, and not right-forward.

To *Sound*, is to try with a Line, or other thing, how deep the Water is.

The *Ship hath spent her Masts*, that is, her Masts have been broke by foul Weather : but if a Ship lose her Masts in Fight, we say, *Her Masts have been shot by the Board*.

To *Splice Ropes*, is to untwist two Ends of Ropes, and then twist them both together, and fasten them, with binding a String about them.

The *Sail is split* : that is blown to pieces.

The *Ship Spooms* : that is, goes right before the Wind without any Sail.

Spring-Tides, are the Tides at New and Full Moon, which flow highest, and ebb lowest, and run strongest.

The *Bowprit Screeves*, that is stands, too upright.

T

Tack about : that is, bring the Ship's Head about to lie the other Way.

Talle ast the Sheets, a Term us'd for hawling ast the Sheets of the Main or Fore-sail.

A Windward-Tide, when the Tide runs against the Wind.

A Leeward-Tide, when the Wind and Tide go both one way.

A Tide-Gate, where the Tide runs strong.

To tide it up, is to go with Tide against the Wind, and when the Tide alters, to lye at Anchor till it serve again.

It flows Tide and half Tide: that is, it will be high Water sooner by Three Hours by the Shore than in the Offin.

To Tow, is to drag any thing after the Ship.

Traverse, is the Ship's Way.

U

To Veer, is to let out, as *Veer more Rope*, *Veer more Sheet*.

W

The Ship is Walt: that is, wants Ballast.

To Weather a Ship, is to go to Windward of her.

To Wind a Ship, is to bring her Head about.

How Winds the Ship? That is, upon what Point of the Compass does she lie with her Head.

To Would, is to bind Ropes about the Mast, or the like, to keep on a Fish, or strengthen it.

Y

The Ship Yaws: that is, goes in and out, and does not Steer steady.

Yunkers, are the Young Fore-mast Men.

A LIST of the Royal Navy of England in the Year 1723.

First Rates, Seven.

	Men	Guns.
Royal Anne	780	100
Britannia	780	100
Royal George	780	100
London	780	100
Royal Sovereign	850	100
Victory	780	100
Royal William	780	100

Second Rates Thirteen.

Barfleur	680	90
Blainheim	680	90
Prince George	680	90
St. George.	680	90
Marlborough	680	90
Namure	680	90
Neptune	680	90
Prince	680	90
Princeefs	680	90
Ramillies	680	90
Sandwich	680	90
Vanguard	680	90
Union	680	90

Third

Third Rates. Forty.

	<i>Men</i>	<i>Guns</i>
Boyne	520	80
Cambridge	520	80
Chichester	520	80
Cornwall	520	80
Cumberland	520	80
Devonshire	520	80
Dorsetshire	520	80
Humber	520	80
Lancaster	520	80
Newark	520	80
Norfolk	520	80
Ranelagh	520	80
Russel	520	80
Shrewsbury	520	80
Somerset	520	80
Torbay	520	80
Bedford	440	70
Barwick	440	70
Burford	440	70
Bredah	440	70
Buckingham	440	70
Captain	440	70
Edenburgh	440	70
Elizabeth	440	70
Essex	440	70
Prince Frederick	440	70
Grafton.	440	70
Hampton Court	440	70
Ipswich	440	70
Kent	440	70
	<i>B</i>	<i>Lenox</i>

	Men	Guns
Lenox	440	70
Monmouth	440	70
Nassau	440	70
Northumberland	440	70
Royal Oak	440	70
Orford	440	70
Revenge	440	70
Suffolk	440	70
Sterling Castle	440	70
Yarmouth	440	70

Fourth Rates, Sixty-Four.

Canterbury	365	60
Defyance	365	60
Dreadnought	285	60
Dunkirk	365	60
Exeter	365	50
Kingstone	365	50
Lyon	365	50
Mary	365	50
Medway	365	50
Montague	365	50
Nottingham	365	50
Plymouth	365	50
Rippon	365	50
Rupert	365	50
Sunderland	365	50
Superbe	365	50
Windfor	365	50

	Men	Guns
York	365	60
Advice	280	50
St. Albans	280	50
Anthelope	280	50
Argyle	280	50
Affiance	280	50
Bristol	280	50
Burlington	280	50
Centurion	280	50
Chatham	280	50
Chester	282	50
Colchester	280	50
Dartmouth	280	50
Deptford	280	50
Dragon	280	50
Falkland	280	50
Falmouth	280	50
Gloucester	280	50
Greenwich	280	50
Guernsey	280	50
Hampshire	280	50
Jersey	280	50
Leopard	280	50
Litchfield	280	50
Newcastle	280	50
Nonfuch	280	50
Norwich	280	50
Oxford	280	50
Panther	280	50
Pembroke	280	50
Portland	280	50
Preston	280	50
Recheſter	280	50

	<i>Men</i>	<i>Guns</i>
Rumney	280	20
Ruby	280	50
Salisbury	280	50
Severn	280	50
Strafford	280	50
Swallow	280	50
Suthetland	280	50
Tilbury	280	50
Tyger	280	20
Warwick	280	50
Weymouth	280	50
Winchester	280	50
Woolwich	280	50
Worcester	280	50

Fifth Rates, Thirty-one.

Adventure	190	40
Royal Anne Galley	190	40
Anglesea	190	40
Charles Galley	190	40
Diamond	190	40
Dover	190	40
Enterprize	190	40
Feverham	190	40
Folkstone	090	40
Fowey	190	40
Gosport	190	40
Hastings	190	40
Hector	190	40
Lark	190	40
Launceston	190	40
Ludlow Castle	190	40

	Men.	Guns.
Lynn	190	40
Mary Galley.	190	40
Portsmouth	190	40
Pearle	190	40
Roebuck	190	40
Southampton	190	40
Sapphire	190	40
South-Sea-Castle	190	40
Bridgewater	155	30
Dolphin	155	30
Kinfale	155	30
Lowestoff	155	30
Mermaid	155	30
Tartar	155	30
Looe	155	30

Sixth Rates, Twenty-five.

Aldborough	115	24
Deal Castle	115	24
Flamborough	111	24
Fox	115	24
Phoenix	115	24
Solebay	115	24
Squirrel	115	24
Biddeford	115	24
Blanford	115	20
Dursley Galley	115	20
Experiment	115	20
Gibraltar	115	20
Greyhound	115	20
Lively	115	20
Lyme	115	20

	Men	Guns
Port Mahone	115	20
Rofs	115	20
Rye	115	20
Scarbourough	115	20
Seaford	115	20
Sea Horse	115	20
Shoreham	115	20
Sheerness	115	20
Success	115	20
Winchelsea	115	20

Fire Ships, Four.

Bedford Galley	45	3
Griffin	45	3
Garland	45	3
Poole	45	3

Bombs, Three.

Basilisk	30	6
Furnace	30	6
Thunder	30	6

Yatches, Fourteen.

Bolton	30	6
Carolina	50	20
Charlotte	30	3
Chatham	30	4
Drake	30	
Dublin	30	12
Fubbs	30	12
Henrietta		

	Men
Henrietta	30
Jemmy	30
Katherine	30
Mary	30
Portsmouth	30
Queenborough	30
William and Mary	30

Sloops, Ten.

Drake	35
Happy	35
Sharke	35
Tryal	35
Bonetta	35
Ferret	35
Otter	35
Swift	35
Hawk	35
Spy	35

Hoys, Eleven

Forrester	7
Heyling	7
Lyon	7
Navy Transport	7
Plymouth Transport	7
Sheerneys Water-	
Boat	7
Supply	7
True Love	7
Old True Love	7

E 4

Unity

	<i>Men</i>
Unity	7
Woolwich Transpott	7

Smacks, Two

Royal Escape
Mary

Store-ship, One.

Success

Hulks, Eight.

Chatham
Exeter
Gloucester
King's Fisher
Plymouth
Thunderbolt
Sunderland
Berwick

Ships Victualling Ports.

In England. London, Chatham, Dover, Portsmouth, Plymouth, Harwich, Hull and Newcastle.

In Ireland, King'sale and Dublin.

*Lords Commissioners for executing the Office of Lord
High-Admiral of Great-Britain and Ireland,
with the principal Officers under them.*

Salary per Annum.

	<i>E.</i>
James Earl of Berkley	3000
Sir John Jennings	1000
John Cockburn, Esq;	1000
William Chitwynd, Esq;	1000
Sir John Norris,	1000
Sir Charles Wager	1000
Daniel Poltney, Esq,	1000
Josiah Burchett, Esq; Secretary.	800
Thomas Corbett, Esq; Chief Clerk.	400
Thomas Hawes,	150
William Young,	120
Gregory Westcomb,	100
Robert Osborn,	80
Andrew Ram,	70
John Varney	60
Luke Bennett, Messenger.	50

A D M I R A L S.

James Earl of Berkley, Vice-Admiral of Engl.
George Ld. Torrington, Admirals of the
Sir John Jennings } White.
Sir John Norris, Admiral of the Blew.
Sir Charles Wager, Vice-Admiral of the Red.
James Littleton, Esq; Vice-Adm. of the White
James Mighells, Esq; Vice-Adm. of the Blew.
George Delavall, Esq; Rear-Adm. of the Red.
Francis Hosier, Esq; Rear-Adm. of the White
Edw. Hopson, Esq; Rear-Adm. of the Blew.

E. 5

Rules

*Port-
e.*

Lords

*Rules to be observed in the Payment
of the N A V Y.*

Flag-Officers, Captain, Lieutenants, Masters, and Chirurgeons, shall receive double Pay in Time of War.

Flag-Officers, Captains of *First, Second, Third, Fourth and Fifth Rates*, and Fireships, shall receive single Pay in Time of Peace.

Lieutenants of *First, Second and Third Rates*, that have served a Year, or in one Engagement, shall receive single Pay in Time of Peace.

Masters of *First, Second and Third Rates*, that have served a Year, or in one Engagement, shall receive single Pay in Time of Peace.

These Officers are to attend His Majesty's Service, and their Pay Salary will be paid Quarterly, otherwise they lose the Benefit thereof.

An

An Exact Table of each Officers Pay by Month, in each Rate of Ship belonging to the Royal Navy of England, from a Captain to an Armourer.

Officers.	1st Rate.			2d Rate.		
	l.	s.	d.	l.	s.	d.
Captain per Day	1	10	0	1	4	0
Lieutenant per Day	0	6	0	0	6	0
Master per Month	14	6	0	12	12	0
Boatswain	4	0	0	3	10	0
Gunner	4	0	0	5	10	0
Carpenter	4	0	0	3	10	0
Purser.	4	0	0	3	10	0
Chirurgeon	5	0	0	5	0	0
Mast. Mate and Pilot	3	6	0	3	0	0
Quarter-Master	1	15	0	1	15	0
Quarter-Mast. Mate	1	10	0	1	10	0
Boatswain-Mate	1	15	0	1	15	0
Yeomen of Sheets.	1	12	0	1	10	0
Gunner's Mate	1	15	0	1	15	0
Quarter-Gunner	1	6	0	1	6	0
Carpenter's-Mate	2	0	0	2	0	0
Ordinary or Crew	1	6	0	1	6	0
Chirurgeon's-Mate	1	10	0	1	10	0
Steward	1	5	0	1	5	0
Steward's-Mate	1	0	0	1	0	0
Midship-Men	2	5	0	2	0	0
Corporal	1	15	0	1	12	0
Coxswain	1	12	0	1	10	0
Trumpeter	2	10	0	1	8	0
Cook	1	5	0	1	5	0
Armourer	1	5	0	1	5	0

3d Rate.			4th Rate.			5th Rate.			6th Rate.		
<i>l.</i>	<i>s.</i>	<i>d.</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>	<i>l.</i>	<i>s.</i>	<i>d.</i>
1	0	0	0	15	0	0	12	0	0	10	0
0	5	0	0	5	0						
9	7	4	8	12	4	7	15	0	<i>C. is Mast.</i>		
3	0	0	2	10	0	2	5	0	2	0	0
3	0	0	2	10	0	2	5	0	2	0	0
3	0	0	2	10	0	2	5	0	2	0	0
3	0	0	2	10	0	2	5	0	2	0	0
5	0	0	5	0	0	5	0	0	5	0	0
2	16	2	2	7	10	2	2	0	2	2	0
1	12	0	1	10	0	1	8	0	1	6	0
1	8	0	1	8	0	1	6	0	1	5	0
1	12	0	1	10	0	1	8	0	1	6	0
1	8	0	1	8	0						
1	15	0	1	10	0	1	8	0	1	6	0
1	5	0	1	5	0	1	5	0	1	5	0
1	16	0	1	14	0	1	12	0	1	10	0
1	5	0	1	5	0	1	5	0	1	5	0
1	10	0	1	10	0	1	10	0	1	10	0
1	5	0	1	3	4	1	0	8	1	0	0
1	0	0	1	0	8						
1	17	0	1	13	9	1	10	0	1	10	0
1	10	0	1	10	0	1	8	0	1	5	0
1	8	0	1	8	0	1	6	0			
1	5	0	1	5	0	1	5	0	1	4	0
1	5	0	1	5	0	1	5	0	1	4	0
1	5	0	1	5	0						

An Exact Pay Table for Masters, Gunners, Carpenters, Boatswains, Purfers and Chirurgeons, from One Day to Six, and for all Rates of Ships belonging to the Royal Navy.

Note, That the Chirurgeons has alike Pay in all Ships.

First Rate.

1 Day.	2 Days.	3 Days.	4 Days.
1 10 0	1 0 0	1 10 0	2 0 0
0 2 10	0 5 8	0 8 6	0 11 4
0 3 6	0 7 2	0 10 8	0 14 4

Second Rate.

0 9 0	0 18 0	1 7 0	1 16 0
0 2 6	0 5 0	0 7 6	0 10 0

Yeomen of Powder

Cook's-Mate

Coxswain's-Mate

Swober

Cooper

Able Seamen

Ordinary Seamen

Shifter

Barber

of each Rate hath
1l. 4 s. per Month.

of each Rate hath
19 s. per Month.

First

Third Rate.

1 Day.	2 Days.	3 Days.	4 Days.
0 6 8	0 13 4	1 0 0	1 6 8
0 2 0	0 4 3	0 6 4	0 8 6

Fourth Rate.

0 6 0	0 12 2	0 18 4	1 4 6
0 1 9	0 3 6	0 5 4	0 7 1

Fifth Rate.

0 5 8	0 11 4	0 4 0	1 2 10
0 1 8	0 3 2	0 4 9	0 6 3

Sixth Rate.

0 5 6	0 11 0	0 16 6	1 2 0
0 1 5	0 2 10	0 4 3	0 5 8

Third

(III)

First Rate.

5 Days.	6 Days.	
2 10 0	3 0 0	Master Gunner Carpenter Boatswain Purser Chirurgeon
3 14 2	0 17 0	
1 17 10		

A Second Rate.

2 5 0	2 14 0	Master Gunner Carpenter Boatswain Purser
0 12 6	0 15 0	

Third Rate.

1 13 4	2 0 0	Master Gunner Carpenter Boatswain Purser
0 10 8	0 12 9	

Fourth Rate.

3 10 3	1 16 10	Master Gunner Carpenter Boatswain Purser
0 8 1	0 10 8	

Third Fifth

Fifth Rate.

5 Days.			6 Days.			
1	8	6	1	14	2	{ Master Gunner Carpenter Boatswain Purser
0	8	1	0	9	7	

Sixth Rate.

1	7	8	1	13	4	{ Master Gunner Carpenter Boatswain Purser
0	7	1	0	8	6	

First Rate.

1 Week.	2 Weeks.	3 Weeks.	Month.
3 10 0	7 0 0	10 10 0	14 0 0
1 0 0	2 0 0	3 0 0	4 0 0
1 5 0	2 10 0	3 15 0	5 0 0

Second Rate.

3 3 0	6 6 0	9 9 0	12 12 0
0 17 6	1 15 0	2 12 6	3 10 0

Third Rate.

2 6 10	4 13 8	7 0 6	9 7 4
0 15 0	1 10 0	2 5 0	3 0 0

Fourth Rate.

2 3 1	4 6 2	6 9 3	8 12 4
0 12 6	1 5 0	1 17 6	2 10 0

First Rate.

2 Mon. | 3 Mon. | 6 Mon.

28 0 0	42 0 0	84 0 0	Master
			Gunner
			Carpenter
8 0 0	12 0 0	24 0 0	Boatswain
			Purser
10 0 0	15 0 0	20 0 0	Chirurgeon

Second

(114)

Second Rate.

25 4 0	37 16 0	75 12 0	} Master Gunner Carpenter Boatswain Purser
0 0 0	10 10 0	21 0 0	

Third Rate.

18 14 8	28 2 0	56 4 0	} Master Gunner Carpenter Boatswain Purser
0 0 0	9 0 0	18 0 0	

Fourth Rate.

17 4 8	25 17 0	51 14 0	} Master Gunner Carpenter Boatswain Purser
0 0 0	7 10 0	13 0 0	

Fifth Rate.

1 week. | 2 weeks. | 3 weeks. | 1 month.

1 19 2 | 3 17 6 | 5 16 3 | 7 15 0

0 11 3 | 1 2 6 | 1 13 9 | 2 5 0

Sixth

((135))

Sixth Rate.

1 18 9	3 17 6	5 16 3	7 15 0
0 10 0	1 2 6	1 13 9	2 5 0

Fifth Rate.

3 Mon.	3 Mon.	6 Mon.	
15 10 0	23 5 0	46 10 0	{ Master Gunner Carpenter Boatswain Purser
4 10 0	6 15 0	13 10	

Sixth Rate.

15 10 0	23 5 0	46 10 0	{ Master Gunner Carpenter Boatswain Purser
4 10 0	6 15 0	13 20 0	

onth.

o.

o
Sixth

A Table of Degrees of Pay, from 3 l 17 s. 6 d. to 19 Shill. per Month; from 1 Day, to 6 Days, and so to 3 Months, very useful for all Seamen, whether they belong to the Navy, or Merchant-men.

1 Day	2 Days.	3 Days.	4 Days	5 Days	6 Days
l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.	l. s. d.
02 9	05 6	08 3	11 0	13 10	16 7
02 6	05 0	07 6	10 0	12 6	15 0
02 4	04 8	07 0	9 5	11 9	14 1
02 2	04 4	06 6	8 9	10 11	13 3
02 1	04 3	06 5	8 6	10 8	12 10
02 0	04 0	06 0	8 0	10 0	12 0
01 9	03 6	05 4	7 1	9 11	10 8
01 8	03 5	05 1	6 10	8 6	10 7
01 7	03 2	04 9	6 5	8 0	9 7
01 6	03 0	04 6	6 0	7 6	9 0
01 5	02 10	04 3	5 8	7 1	8 6
01 4	02 8	04 0	5 4	6 8	8 0
01 3	02 7	03 11	5 2	6 6	7 10
01 3	02 6	03 9	5 0	6 3	7 6
01 2	02 5	03 7	4 10	6 0	7 3
01 2	02 4	03 7	4 9	6 0	7 2
01 1	02 3	03 5	4 6	5 8	6 10
01 0	02 1	03 2	4 2	5 4	6 5
01 0	02 0	03 0	4 0	5 0	6 0
00 11	01 10	02 10	3 9	4 9	5 8
00 11	01 10	02 9	3 8	4 7	5 6
00 10	01 9	02 8	3 6	4 5	5 4
00 10	01 8	02 6	3 5	4 3	5 1
00 10	01 8	02 6	3 4	4 2	5 0
00 8	01 5	02 2	2 11	3 8	4 5
00 8	01 5	02 1	2 10	3 6	4 3
00 8	01 4	02 0	2 8	3 5	4 1

1 Week

1 week			2 week			3 week			1 Month			2 Month			3 Month		
s.	d.	l.	s.	d.	l.	s.	d.	l.	s.	d.	l.	s.	d.	l.	s.	d.	l.
19	4	1	18	9	2	18	1	3	17	6	7	15	0	11	12	6	
17	6	1	15	0	2	12	6	3	10	0	7	0	0	10	10	0	
16	6	1	13	0	2	9	6	3	6	0	6	12	0	9	18	0	
15	4	1	10	8	2	6	0	3	1	5	6	2	10	9	4	3	
15	0	1	10	0	2	5	0	3	0	0	6	0	0	9	0	0	
14	0	1	8	1	2	2	1	2	16	2	5	12	4	8	8	6	
12	6	1	8	0	1	17	6	2	10	0	5	0	0	7	10	0	
11	11	1	3	11	1	15	10	2	7	10	4	15	8	7	3	6	
11	3	1	2	6	1	13	9	2	5	0	4	10	0	6	15	0	
10	6	1	1	0	1	11	6	2	2	0	4	4	0	6	6	0	
10	0	1	0	0	1	10	0	2	0	0	4	0	0	6	0	0	
9	4	0	18	9	1	8	1	1	17	6	3	15	0	5	12	6	
9	2	0	18	4	1	7	6	1	16	8	3	13	4	5	10	0	
8	9	0	17	6	1	6	3	1	15	0	3	10	0	5	5	0	
8	6	0	17	0	1	5	6	1	14	0	3	8	0	5	2	0	
8	5	0	16	0	1	5	3	1	13	9	3	7	6	5	1	0	
8	0	0	16	0	1	4	0	1	12	0	3	4	0	4	16	0	
7	0	0	15	0	1	2	6	1	10	0	3	0	0	4	10	0	
7	0	0	14	0	1	1	0	1	8	0	2	16	0	4	4	0	
6	8	0	13	4	0	0	0	1	6	8	2	13	4	4	0	0	
6	6	0	13	0	0	19	6	1	6	0	2	12	0	3	18	0	
6	3	0	12	0	0	18	9	1	5	0	2	10	0	3	15	0	
6	0	0	12	0	0	17	6	1	4	0	2	8	0	3	12	0	
5	10	0	11	8	0	15	6	1	3	4	2	6	8	3	10	0	
5	2	0	10	4	0	15	0	1	0	0	2	1	4	3	2	0	
5	0	0	10	0	0	15	0	1	0	0	2	0	0	3	0	0	
4	9	0	9	6	0	14	3	1	19	0	1	18	0	2	17	0	

The Use of the Foregoing Tables.

First, Suppose you would know a Gunner of a *Third Rate's* Pay for Three Months. Two Weeks, and Four Days.

You must look in the Table of Masters, Gunners, &c. for the Place of a *Third Rates*, and under 3 Months in the Head of the Page, and over against Gunner, Carpenter, Boat-swain and Purser, (for their Pays are all alike) you will find 9 *l.* which is his Pay for 3 Months: Then look in the Table of Weeks, which is a little to the Left Hand, and 2 Weeks you will find 1 *l.* 10 *s.* and under 4 Days in the Table of Days you will find 8 *s.* 6 *d.* which being added together, makes 10 *l.* 18 *s.* which is the Answer of your Question.

Secondly, If you desire to know what Pay is due to a Mid-ship-man, for 8 Months, 3 Weeks, and 4 Days.

You must look in the Monthly Pay-Table of Officers, for Mid-ship-men, and over-against it you will find (under what Rate he belongs) how much he has a Month; as suppose in a *Third Rate* he has 1 *l.* 17 *s.* per Month, look in the Table of Months, and cast your Eye downward in the Column of one Month, till you come to 1 *l.* 17 *s.* 6 *d.* then opposite to that in the same Line to the Right Hand, and under 6 Months, you'll find 11 *l.* 5 *s.* which is his Pay for 6 Months; then look under 2 Months, and in the same Line,

Line you'll find 13 l. 15 s. then look to the Left Hand in the same Line, and under 3 Weeks you'll find 12. 8 s. 10 d. then look still in the same Line, and under 4 Days, you'll find 5 s. 4 d. which being added together, amounts to 16 l. 3 s. 5 d. which is the Pay due to him for the Time supposed.

*At the Court at Whitehall, the Fifteenth
of December, 1692.*

UPON reading this Day at the Board a Report from the Right Honourable the Commissioners for executing the Office of Lord High Admiral of England, setting forth, That for the Encouragement of the Commanders, Officers and Seamen, serving in their Majesties Ships, their Majesties will be graciously pleased of their Royal Bounty to grant unto them, for their own Use and Benefit, all Privateers of the Enemy which shall be taken by them; together with their Tackle, Apparel, Furniture and Lading, the same to be by them disposed of for their best Advantage, and the Proceed thereof distributed to the Commanders, Officers and Seamen, on Board their Majesty's Ships, which shall take the said Privateers, according to the Proportions following, *viz.*

To the Captain, Two eighth Parts.

To the Lieutenant and Master, One eighth Part, To

To the Boatswain, Gunner, Purser, Carpenter, Master's Mates, Chirurgeon and Chaplain, One eighth Part to be equally divided.

To Midship-men, Carpenter's Mates, Boatswain's-Mates, Gunner's-Mates, Corporal, Yeomen of the Sheets, Coxswain, Quarter-Masters, Quarter-Masters-Mates, Chirurgeons's-Mates, and Yeomen of the Powder-Room, One eighth Part to be equally divided.

Trumpeter, Quarter-Gunner, Carpenter's Crew, Steward, Cook, Armourer, Steward's-Mates, Cook's-Mates, Gunsmith, Cooper, Swobber, Ordinary Trumpet, Barber, Able Seamen, and Ordinary Seamen, Two eighth Parts to be equally divided.

And that the Widow or nearest Relation (if no Widow left) of any Person slain in taking any such Privateers, shall be allowed the like Share as the Person slain ought to have had, according to the Quality in which he served. Dated at the Admiralty Office the 15th Day of December 1692.

His Majesty in Council was graciously pleased to Approve of the said Report, and so Order as it hereby Ordered, That the said Commissioners of the Admiralty do give all necessary Directions and Orders therein accordingly.

The Third Part of any Prize belonging to the Ship's Company, subdivided into Shares, according to the Custom of the Navy, thus :

The Captain, Ten Shares ; the Lieutenant and Master, Eight Shares each.

The Mates, Chirurgeon, Gunner, Boat-swain and Carpenter, Six Shares each.

The Trumpeter, Quarter-Masters, Cooper, Chirurgeon's-Mate, Gunner's-Mate, and Carpenter's-Mate, Five Shares each.

The Corporal, Quarter-Gunner, Steward, Cook and Coxswain, Four Shares each.

The Fore-mast or Mid-mast Men according to their Deserts, some Three, and some Two and a half, and the Boys a single Share. The Captain hath Power to take a whole or half Share from one, and give to another, as he finds they deserve.

A Guide to the Purser and Stewards belonging to the Navy :

Wherein is set down the King's Allowance of Victuals for every Day in the Week ; with Directions how to make up his Accounts, and what Methods to use ; so that he may discharge his Duty to the King, as well as to the Seamen.

To cast up a Proportion of Sea-Victuals for 40 Men
112 Days.

40 Days	
112	
80	
40	
40	
$\frac{1}{7}$) 4480	Pounds of Bread and Gallons of
640	Beer; which divide by 7, gives the
3	number of 4 Pound Pieces of Beef,
$\frac{1}{8}$) 1920	and 3 Pound Pieces of Pork, and
240	Quarts of Pease, which multiplied
2	by 3, and divided by 8, gives 240
480	sized Fish (or Gallons of Oatmeal)
	and Pounds of Butter, which mul-
	tiplied by 2, gives Pounds of
	Cheese.

An Account of what Victuals one Man is allowed for
every Day in the Week.

	S.	M.	T.	W.	T.	F.	S.	for
Bisquet, Pounds	1	1	1	1	1	1	1	7
Beer, Gallons	1	1	1	1	1	1	1	7
Beef, Pounds			2				2	4
Pork, Pounds	1				1			2
Pease, $\frac{1}{2}$ Pints	$\frac{1}{2}$	$\frac{1}{2}$		$\frac{1}{2}$	$\frac{1}{2}$			2
Fish, sized		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{3}{4}$
Butter, Ounces		2		2		2		6
Cheese, Ounces		4		4		4		12

Note, That for Fish they give Oatmeal.

Multiply

Multiply the Number of Men by the Number of Days you are to Victual, and that gives the Number of Pounds of Bread or Bisket. Then for Beer, divide by 60, the Number of Gallons in a Hogshead, and that divided by 4, gives Number of Tuns : As for

Example.

112 Days.

40 Men.

60) 4480 (74 Hogsheads and 40 Gallons,
which divide by 4, gives
 $\frac{1}{4}$ 74 18 Tuns, and 2 Hogsheads,
and 40 Gallons.

Then for your 4480 Pounds of Bread, divide by 7 Four Pound Pieces of Beef, and 2 Pound Pieces of Pork, and Quarts of Pease ($\frac{1}{7}$) 4480 (640.

Then for your 640 Quaris of Pease, divide by 4 makes Gallons, and your Gallons divided by 8, makes Bushels.

Then for your 640 Quarts of Pease, multiply by 3, and divide by 8, and it gives you the fixed Fish, or in lieu thereof, as many Gallons of Oatmeal.

Then for 240 sized Fish, there is also as many Pounds of Butter.

Then for 240 Pounds of Butter, twice so many Pounds of Cheese.

Upon the passing your Accompt, you will be allowed a Tun or Cask *per* Month for Water, and 3 Bisket Baggs for a Fourth Rate ; for Iron Hoops small Allowance.

Have a Care to deduct your $\frac{1}{4}$ Part as well of Beer, Pease and Oatmeal, by Measure, as of Butter, Cheese and Bread by Weight, to make good your Waste, for none dare dispute it without Detriment.

If you have any Provisions to spare, or your Eights in *England*, the Victualler pays, viz.

For	{	Bread	_____	1 d. per Pound.
		Beer	_____	28 Shill. per Tun.
		Beef	_____	8 d. per Piece.
		Pork	_____	5 d. per Piece.
		Pease	_____	2 s. per Bushel.
		Oatmeal	_____	4 s. per Bushel.
		Butter	_____	3 d. $\frac{1}{2}$ per Bushel.
		Cheese	_____	1 d. farth. per Pound.

But what they do to the Southward I don't know.

If your Men have any Provisions to spare that is due, be sure not to refuse the buying of it at such Rates as Money is to be got by it; as Bread at 5 s. 6 d. per Cent. 112 l. to the 100; but have a care to reduce it to 16 Ounces to the Pound. Beef and Pork at 4 d. per Piece, which will turn to Account. If you spend Oatmeal, be sure not to buy your Men out of it, for that will be Loss to you; but if you are to pay first Money, you will receive 9 d. per Month, which you may buy for 6 d. if you let them have Money beforehand.

After you have Victualled and Indented, you must set it down in your Book for that Purpose,

Purpose, and keep your Debtor's part together, that you may give a due Charge to the Surveyor of Victualling, when you come to pass your Account.

Provisions you will receive sometimes, which must always be charged to your Debtor's Part, as also Provisions borrowed from other Ships.

Victualling other Ships Men must be kept an Account of, with their true Names, and Time of Beginning and Ending, and by what Order Victualled; so that you may Discount it with the Purser of that Ship, either by Victualling back, or by Receipts, or Money paid you for it.

At all Times be careful, and have no more Casks than Necessity requires; for the King pays 5 s. per Tun for Cooperage, besides what you do yourself; for you will rarely find the Number of Staves in any Cask, which you must deliver to Tunnage: namely, 28 Butt-staves to a Butt, 26 to a Punchion, 24 to a Hoghead, and 22 to a Barrel. And note, That two pieces of fir. 'e Heading makes a Stave, as well Cautle-pieces as Middle-pieces.

Men will urge you to scuttle Beef, Pork, Pease, Oatmeal, if you will be ruled by them: but you are sure to pay for all your scuttled 4 d. per Butt, 3 d. $\frac{1}{2}$ per Punchion, 3 d. per Hoghead, and 2 d. $\frac{1}{2}$ per Barrel-staves apiece, which avoid as often as you can.

Keep your Cheque-Book going, and let not a Mustex be made without yourself or

Steward, to prevent your Victualling of Men in your own Wrong, when pricked by the Clerk of the Cheque: For do not fancy that these stand for a Cypher, for they will out you of all your Provisions.

You are allowed 6 *d.* Man *per* Month Necessary Money, with which you are to buy Wood, Candles, and Turnery-Ware.

Your Lading Charges is 2 *s.* *per* *Mensem*. Your Adds Money 3 *s.* 4 *d.* *per* Month, You are allowed 4 *d.* *per* Tun for Drawage of the whole Provisions of Beer, all which the Victualler will pay you when you Indent.

You are allowed 8 *d.* *per* Man a Month Extra-necessary-Money, which you are to receive when you Indent.

If you Indent for a Proportion of Men under 60, then you are allowed 9 *d.* a Man a Month, but no Adds Money.

Your under Gauge is according to what your Cask holds, *viz.*

A Butt	108 Gallons.
A Punchion	72
A Hoghead	54
A Barrel	36

According to the Gauge, and what is less than there is under Gauge, and what is wanting of your Gauge, the Victualler will allow for it after the Rate of 30 *s.* *per* Tun, and sometimes 28 *s.*

Take the Account of the under Gauge as follows: Admit I was to take in 40 Butts as
more

more, set down the Number gradually, 1, 2, 3, 4, &c. and so to 40, and set the Mark on the Head against the Number, then add up all together, and divide the Total by 216, and the Quotient is Tuns.

If you take in *Cheshire-Cheese* for *Suffolk*, you must allow 3 Pounds of *Suffolk* for 2 Pound of *Cheshire*.

If you take in Flower and Currants for Beef, and for Pork and Pease, you must have 3 Pounds of Flower, and half a Pound of Currants for a Piece of Beef, and Piece of Pork and Pease.

All that you deliver by Weight or Measure; you must keep back the 8th Part for Waite; you must take care that the Weight be made after the Rate of 14 Ounces to the Pound, and that Measure is 7 Pints to the Gallon.

If at any Time you deliver to any other Ship any Proportion of Cask Bags, or Iron-Hoops, take a Receipt for the same, specifying the Particulars in Words at length; and deliver none without an Order from your Commander, and take a Receipt for the same.

If you go into any Harbour in the Time of your Voyage, and enter into Petty-warrant, you are to specify in your Sea-Book the Ending of Sea-Victuals, and the Beginning of Petty-warrant; and Ending of the same, and Beginning of Sea-Victuals.

In Petty-warrant you are allowed 12 *d.* a Man *per* Month Necessary Money, but not Adds Money, Lading Charges, and Drawage.

When you receive any Warrants from the Clerk of the Cheque for Victualling, be sure (before you give it the Victualler) take a Copy of them, that you may know by casting up your Warrantes, what they amount to.

You must be sure to return to your Cask and Bisket-bags, for they will make you pay 20 s. per Tun for Cask, and 12 d. for each Bag.

When you cast your Petty-warrant up, you are not to cast after the manner you cast your Sea-Victuals; but you must take a particular Account how many Fish Days, and how many Flesh Days, there are in that Warrant; so many Pieces of Pork, Quarts of Pease; Flesh Days, half a Piece of Pork, half a Piece of Beef, one 8th Part of sized Fish, 2 Ounces of Butter, and a quarter of a Pound of Cheese, Bread and Beer, as above.

In Petty-warrant you have 2 Pound Loaves, and each Man to have the half of it a Day; when you make up your Petty-warrant Account, make yourself Debtor and Creditor as follows; that is, Debtor on the Left Hand to all Provisions received, with Cask, Iron Hoops and Bags; and on the Right Hand Creditor, by what your Petty-Warrant amounts to, and by Cask, Iron Hoops, and Bisket-bags, returned.

Exact Table
OF
PROPORTIONS
FOR THE
Thicknes of Masts,
According
To their Lengths.

Being very useful for Young Carpenters, who go to Sea in Ships :
Showing how to make any Mast in the Ship, whether great or small, according to the truest Dimensions. from 10 Foot long to 100 Foot long, and may serve for any Mast now in use :
Giving a true Proportion of Thicknes in Inches for every 3 Foot in Length.

Length in Feet.	Thick. in Inches.	Length in Feet.	Thick. in Inches.	Length in Feet.	Thick. in Inches.	Length in Feet.	Thick. in Inches.
10	03	33	11	56	18 $\frac{2}{3}$	79	26 $\frac{1}{3}$
11	03 $\frac{1}{3}$	34	11 $\frac{1}{3}$	57	19	80	26 $\frac{2}{3}$
12	04	35	11 $\frac{2}{3}$	58	19 $\frac{1}{3}$	81	27
13	04 $\frac{1}{3}$	36	12	59	19 $\frac{2}{3}$	82	27 $\frac{1}{3}$
14	04 $\frac{2}{3}$	37	12 $\frac{1}{3}$	60	20	83	27 $\frac{2}{3}$
15	05	38	12 $\frac{2}{3}$	61	20 $\frac{1}{3}$	84	28
16	05 $\frac{1}{3}$	39	13	62	20 $\frac{2}{3}$	85	28 $\frac{1}{3}$
17	05 $\frac{2}{3}$	40	13 $\frac{1}{3}$	63	21	86	28 $\frac{2}{3}$
18	06	41	13 $\frac{2}{3}$	64	21 $\frac{1}{3}$	87	29
19	06 $\frac{1}{3}$	42	14	65	21 $\frac{2}{3}$	88	29 $\frac{1}{3}$
20	06 $\frac{2}{3}$	43	14 $\frac{1}{3}$	66	22	89	29 $\frac{2}{3}$
21	07	44	14 $\frac{2}{3}$	67	22 $\frac{1}{3}$	90	30
22	07 $\frac{1}{3}$	45	15	68	22 $\frac{2}{3}$	91	30 $\frac{1}{3}$
23	07 $\frac{2}{3}$	46	15 $\frac{1}{3}$	69	23	92	30 $\frac{2}{3}$
24	08	47	15 $\frac{2}{3}$	70	23 $\frac{1}{3}$	93	31
25	08 $\frac{1}{3}$	48	16	71	23 $\frac{2}{3}$	94	31 $\frac{1}{3}$
26	08 $\frac{2}{3}$	49	16 $\frac{1}{3}$	72	24	95	31 $\frac{2}{3}$
27	09	50	16 $\frac{2}{3}$	73	24 $\frac{1}{3}$	96	32
28	09 $\frac{1}{3}$	51	17	74	24 $\frac{2}{3}$	97	32 $\frac{1}{3}$
29	09 $\frac{2}{3}$	52	17 $\frac{1}{3}$	75	25	98	32 $\frac{2}{3}$
30	10	53	17 $\frac{2}{3}$	76	25 $\frac{1}{3}$	99	33
31	10 $\frac{1}{3}$	54	18	77	25 $\frac{2}{3}$		
32	10 $\frac{2}{3}$	55	18 $\frac{1}{3}$	78	26		

The use of the Table is thus.

Suppose you have a Mast 46 Foot in Length, and you would know how many Inches of Diameter of this Mast should be in the Partners, according to Proportion,

Enter the Table in the Column of the Length of Feet at the Head, and look for 46, and right against it in the Column of Inches, you will find 15 Inches and one third part of

Th
m

of an Inch, which is the Thickness of the Mast, whose Length is 46 Foot ; the like you may do by any Number of Feet contained in the Table without any farther trouble.

A Table, shewing how many Inches any Mast from 10 to 100 Feet long ought to be in the middle.

Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.
10	03	28	08	46	13	64	18	82	23
11	03	29	08	47	13	65	19	83	24
12	03	30	08	48	14	66	19	84	24
13	03	31	09	49	14	67	19	85	24
14	04	32	09	50	14	68	19	86	25
15	04	33	09	51	14	69	20	87	25
16	04	34	10	52	15	70	20	88	25
17	05	35	10	53	15	71	20	89	26
18	05	36	10	54	15	74	21	90	26
19	05	37	10	55	16	75	21	91	26
20	05	38	11	56	16	76	21	92	26
21	06	39	11	57	16	77	22	93	27
22	06	40	11	58	16	78	22	94	27
23	06	41	12	59	17	79	22	95	27
24	07	42	12	60	17	80	22	96	28
25	07	43	12	61	17	81	23	97	28
26	07	44	12	62	18	82	23	98	28
27	07	45	13	63	18	83	23	99	29

The use of this Table is the same as the former is, only the difference of the Diameters of

of the thickness of the Mast in the Partners, add the middle, which is $\frac{1}{4}$ part of an Inch in every 3 Foot of the length of the Mast.

A Table, shewing how many Inches any of these Masts of the former Dimensions ought to be in the Heads.

Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.	Length in Feet	Thickness in Inches.
10	02	28	07	46	11	64	16	82	20
11	02	29	07	47	11	65	16	83	20
12	03	30	07	48	12	66	16	84	21
13	03	31	07	49	12	67	16	85	21
14	03	32	08	50	12	68	17	86	21
15	04	33	08	51	12	69	17	87	21
16	04	34	08	52	13	70	17	88	22
17	04	35	08	53	13	71	17	89	22
18	04	36	09	54	13	72	18	90	22
19	04	37	09	55	13	73	18	91	22
20	05	38	09	56	14	74	18	92	23
21	05	39	09	57	14	75	18	93	23
22	05	40	10	58	14	76	19	94	23
23	05	41	10	59	14	77	19	95	23
24	06	42	10	60	15	78	19	96	24
25	06	43	10	61	15	79	19	97	24
26	06	44	11	62	15	80	20	98	24
27	06	45	11	63	15	81	20	99	24

This

This Table is of the same Use as the Two former only it is Calculated for the Diameters of the Heads of the Mast, and they are lesser Diameters because all Masts are bigger below, than they are aloft.

NOW by this Rule any Ingenuous Man, with very little Trouble, may find the Length of any Mast whatsoever, whether great or small Masts, belonging to a Ship; but for Ketches, Yatches, Smacks or Hoyes, this will be no true Proportion for their Masts, because all such Vessels that go but upon one Mast, they have all the Sails that belong to them hanging wholly upon that one Mast; and therefore consequently that one Mast ought to be stronger, and and therefore thicker; and it requires to be so, by reason of the great Strain it is subject to; but in Ships it is not so; for in Ships the Main-mast supports or bears up only that which properly belongs to itself, as the Top-mast, Top-gallant-mast, and the Rigging, Sails, or the like: The Fore-mast performeth the same Office for itself, and the Mizon-mast doth the like for itself, and the Bowsprit, upon which all the other Masts have a Dependance for their Support, as every expert Seaman knows, therefore we will say no more as to this Point.

But only to satisfie you how the Tables are made and calculated for Ships, and by them you may find the Thickness of any, or all, of the Masts belonging to any Ship,
if

if you do but mind their Lengths, and work according as is shewed in the former Directions that you will find in this Book, which will direct and guide you in your Work with Abundance of Ease.

*The Rates or Fares of Watermen,
as they were set foeth by the Lord
Mayor and Court of Aldermen.*

	Oars.		Skuller.	
	s.	d.	s.	d.
From London to Limehouse, New Crane, Shadwell-Dock, Bell-wharf, Ratcliff-Cross —	01	00	00	06
To Wapping-Dock, Wap- ping-New, and Wapping- Old, Stairs, the Hermitage, Rotherhith Church Stairs, and Rotherhith Stairs. —	00	06	00	03
From St. Olaves to Rother- hith Church Stairs, and Ro- therhith Stairs. —	00	06	00	03
From Billingsgate, and St. Olaves, and St. Saviour's Mill. —	00	06	00	03
All the Stairs between Lon- don-Bridge and Westminster. —	00	06	00	03
From either Side above London- Bridge, to Lambeth and Fox- Hall. —	01	00	00	06

From

From London to

	Oars.		Skullers.	
	s.	d.	s.	d.
From White-Hall to Lambeth and Fox-Hall. —————	00	06	00	03
From Temple, Dorset, Black-Friars, Stairs, and Paul's Wharf to Lambeth. —————	00	08	00	04
Over the Water directly in the next Skulley, between London-Bridge and Limehouse, or London-bridge and Fox-hall —	00	04	00	02

	O A R S.		whole Fare.		Com-pany.	
	s.	d.	s.	d.	s.	d.
Gravesend —————	04	06	00	09		
Graife or Greenhive —————	04	09	00	08		
Purflet or Eriff —————	03	00	00	06		
Woolwich —————	02	06	00	04		
Blackwall —————	02	00	00	04		
Greenwich or Deptford —————	01	06	00	03		
Chelsey, Battersea, Wansworth —————	01	06	00	03		
Putney, Fulam, Barn-Elms —	02	06	00	04		
Hammersmith, Chiswick, or Mortlock —————	03	06	00	06		
Brentford, Isleworth, or Richmond —————	03	06	00	06		
Twickenham —————	04	00	00	06		
Kingstone —————	05	00	00	06		
Hampton-Court —————	06	00	00	09		
Hampton-Town, Sunbury, or Walton —————	07	00	01	00		
Weybridge and Chertsey —————	10	00	01	00		
Stanes —————	12	00	01	00		
Windfor —————	14	00	02	00		

From London to

*Rates for Carrying of Goods in the Tilt-Boats, between
Gravesend and London.*

	<i>s.</i>	<i>d.</i>
A half Firkin	00	01
A whole Firkin	00	02
A Hogshead	02	00
A Hundred Weight of Iron, Cheese or any other heavy Goods	}	00 04
A Sack of Salt or Corn		00 06
An ordinary Chest or Trunk		00 06
An ordinary Hamper		00 06
The Hire of the whole Tilt-Boat		22 06
Every single Person in the ordinary Passage	}	00 06

What Watermen take and demand more than these Rates lies liable to pay Forty Shillings, and suffer half a Year's Imprisonment. And if he refuse to carty any Passenger or Goods at these Rates, upon Complaint thereof made to the Lord Mayor and Court of Aldermen, he shall be suspended from his Employ for Twelve Months.

*The Principal Officers and Commissioners of the
Royal NAVY.*

George Lord Torrington, Treasurer.
George Swanton, Esq; Comptroller.
Sir Jacob Ackworth, Surveyor.
Tempest Holms, Esq; Clerk of the Acts.

Richard

Richard Burton, Esq; { Comptroller of the
 { Treasurer's Account.
John Fowler, Esq; { Comptroller of the
 { Victualling Accounts.
William Cleeland, Esq. { Comptroller of the
 { Store-keeper's Acc^t.
Thomas KemPTHORN, Esq; Commissioner at Chatham.
Sir Isaac Townsend. Ditto at Portsmouth.
Francis Dove, Esq. Ditto at Plymouth.
Mt. Sam. Percival. { Assistant to the Clerk of
 { the Acts.
Mr. William Prescott. { Assistant to the Comp-
 { troller of the Victual-
 ling Accounts.

Commissioners for Victualling the
Navy.

Sir George Sanders. *William Fisher, Esq.*
Peter Joye, Esq. *Henry Cartwright, Esq.*
William Passinger, Esq. *Thomas Beer, Esq.*
Stephen Biss, Esq,
Mr. Spring Mansely. Secretary.
Mr. ——— Bishop. Accomptant.

Note, In every of his Majesty's Yards throughout England, and every where, where there is a Yard belonging to the King are employed the following Officers, viz.

A Clerk of the Cheque.
 A Store-Keeper.

Two

Two Master Attendants.

A Master Shipwright.

Two Attendants to the Master Shipwright.

A Clerk of the Survey,

A Chirurgeon.

A Sail-Maker.

A Porter for opening and shutting the Gates
with several Petty-Officers.

A Compendium of Sea-Gunnery.

P R O P. I.

*The Names of the Principal Members of
a Piece of Ordnance.*

THE outside round about the Piece is called the *Superfices of Metal*, the Substance, or whole Mass of Metal, the *Body*; the Hollowness, or Concave Cylinder, the *Bore*; so much of her Bore as containeth the Powder and Shot, is the *Chamber*, or *Charged Cylinder*; the Remainder, her *Vacant Cylinder*, the Spindals or Ears, are called the *Trunnions*; the Pummel at her Coyle, the *Casacabel Deck*; the little Hole, her *Touch-hole*; all the Metal behind the Touch-hole, her *Breech* or *Coyle*; the greatest Ring at her Touch-hole, her *Base-Ring*; the next Ring above the Touch-hole, her *Reinforced Ring*; the next to that, her *Trunnion-Ring*; the Ring next the Mouth, her

her Muzzle-Ring; the Ring between the Trunion-Ring and Muzzle-Ring, her Cornish-Ring; all the Rings and Circles about the Muzzle, the Frieze, the whole length, the Chace.

P R O P. II.

What Instruments a Gunner ought to be furnished withall.

Calliper Compasses, large and small, for taking Diameters; Brass Heights for Shot, Inch Sight-rule, Gunner's Scale, Gun's Quadrant, with a Geometrical Square, to take Mountures, Levels, &c. Brass Compasses with Steel Points, and a Book wherein to keep his Accounts.

P R O P. III.

How to dispart a Piece of Ordnance:

To dispart a Piece, is to set such a Mark upon the Muzzle-Ring, or thereabouts, that a Sightline taking upon the Top of the Base Ring against the Touch-hole, by the Mark, at, or near, the Muzzle, may be parallel to the Axis of the Concave Cylinder; which to do, take the Diameter of the Base-Ring, and likewise of the Place of the Muzzle, where you intend the *Dispart* to stand; that done, divide the difference of these two Diameters into two equal Parts, and one of them will be the true *Dispart*; which set upon the Gun with

with Pitch or Wax, or which is better, to have an Iron with a Spring and a Transome; the Transome is to be made to go up and down, according to the Diameter and Thickness of any Piece; the Transome should be made long enough to reach from the Touch-hole to the Base-Ring.

PROP. IV.

How to Tertiate a Piece of Ordnance.

Tertiate a Piece, is to know the Thickness of the Metal at the Touch-hole, Trunnion, and Neck, by which you judge at the Strength of the Gun; that is, whether it be well fortified or no; this you must do with a Caliber Pair of Compasses; and if the Piece be home-bored, the Diameter less by the height, divided by 2, is the Thickness at any place. There are three Degrees used in Fortifying each Sort of Ordnance, both Cannons and Culverins. First, That such as are ordinarily Fortified, are called *Legitimate Pieces*: Secondly, Such whose Fortification is lessened, are called *Basterd Pieces*: Thirdly, Double Fortified Pieces, are called *Extraordinary Pieces*.

The Cannons double Fortified have fully one Diameter of their Bore in Thickness of Metal at their Touch-holes, and $\frac{1}{2}$ at their Trunnions, and $\frac{1}{4}$ at their Muzzle.

The lessened Cannons have at their Touch-hole but $\frac{3}{4}$ of the Diameter of their Bore in Thickness

Thickness of Metal, and $\frac{1}{2}$ at their Trunnions, and $\frac{1}{2}$ at their Muzzle. The ordinary fortified Cannons have $\frac{1}{2}$ at the Touch-hole, $\frac{1}{2}$ at the Trunnions, and $\frac{1}{2}$ at the Muzzle. All the double fortified Culverins, and all lesser Pieces of that kind, have one Diameter, and $\frac{1}{2}$ at the Touch-hole, $\frac{1}{2}$ at the Trunnions, and $\frac{1}{2}$ at Muzzle; and the ordinary fortified Culverins are fortified every Way, like the double fortified Cannons. And the lessened Culverins, like the ordinary fortified Parts.

P R O P. V.

How to discover whether there be any Flaws, Crack or Honey-Combs, in a Piece of Ordnance.

First, Cleanse the Piece very well, then put in an usual Searcher, made with several Springs, which points like great Pins Heads bending outwards; which being bended together with your Hand until it will enter into the Mouth of the Piece, and put up to the Bottom of the Bore, and turned round in the Motion of pulling it in and out of the Chase; and if there be any Honey-combs or Flaws, the Points will stick therein.

Another Way to discover Cracks.

Strike a smart Stroke with a Hammer on the Outside of the Piece; if the Sound be hoarse, there is some Crack; but if the Sound be clear, the Piece is Sound.

P R O P.

P R O P. VI.

To know what Bullet is fit to be used for any Gun.

Divide the Diameter (or Height) of the Bore of the Gun into 20 equal Parts, and the Diameter (or Height) of the Bullet, fit to be used for that Gun, must be 19 of those Parts.

P R O P. VII.

To find how much Powder is sufficient both for Proof and Action of any Piece of Ordnance.

The Rule.

Multiply the Weight of the Ball (fit for the Piece) by the Number of Calibers in the Circumference of the Breech, and for Proof, multiply that Product by 8, and for Service, by 6; that done, divide each particular Product by 96, and the Quotient gives you the Number of Pounds of (ordinary corned) Powder.

Example.

Suppose an Iron Ball, weighing 24 l. be fit for a Gun whose Breech contains 9 Calibers or Diameters of the Bore in Circumference, I demand the Quantity of Powder fit for Proof and Action.

Ball

Ball 24 l.

Calib. 9

216

8

24 l.

9

216

6

36) 1728 (18 l. Pro. IX.) 1296 (13. 5 l. Aq.

768

0

336

48,0

0

P R O P. VIII.

To make Ladles to load your Guns with,

The Ladles ought to be so proportioned for every Gun, that two Ladle fulls of Powder may Charge the Piece, which in general Terms is thus.

The Breadth of all Ladles are to be two Diameters of the Shot, that so a third Part of the Compasses may be left open for the Powder to fall freely out of the Ladle, when you turn it Bottom upwards; the Length of the Ladles must be somewhat different, according as the Piece is fortified.

For double fortified Cannons, the Length of the Ladle may be two Diameters, and one half of the Shot, beside so much as is necessary to fasten it to the Head of the Ladle-staff,

Staff, which will require one Diameter more of Plate, but this is not reckoned to the Length of the Ladle, because it holds no Powder.

For ordinary Cannons the Ladles must not exceed 2 Diameters of their Shot in Length.

For Culverins and Demi-culverins the Ladle may be three Diameters of their Shot, and an half for lesser Guns, and to load them at twice; if you would load them at once, you must double the Length of the Ladle.

This may be observed for a general Rule, That a Ladle 9 Balls in Length, and 2 Balls in Breadth, will hold the just Weight of the Iron-shot in Powder.

But Note, That Iron Ordnance must have but 3 quarters of the Charge of Brass Ordnance.

P R O P. IX.

How, by knowing the Weight of one Bullet, to know what any other Bullet will weigh.

It is a common Opinion, and very near to the Truth, That a Bullet of Cast-Iron of four Inches Diameter weighs 9 Pounds of *Averdupois* Weight.

Now, if an Iron-Bullet of 4 Inches Diameter weighs 9 Pound, what shall another Iron-Bullet of 8 Inches Diameter? You are to note, That all Bullets have a cubical Proportion one to another; therefore as 64 (the Cube of 4) is to 9 l. so it is 512 l. the Cube of 8) to 72 l.

According to this Proportion the following Table is Calculated.

A Table of the Diameter of Iron Spheres.

Weight pounds.	Diameter Inc. Cent.		W. po.	Diameter Inch Cent.		W. po.	Diameter Inc. Cent.	
0.5	1	53	24	5	55	52	7	18
0.75	1	75	25	9	62	53	7	22
1	1	92	26	5	70	54	7	27
1.5	2	20	27	5	77	55	7	31
2	2	42	28	5	84	56	7	39
2.5	2	61	29	5	91	57	7	40
3	2	77	30	5	98	58	7	44
3.5	2	92	31	6	04	59	7	49
4	3	05	32	6	11	60	7	53
5	3	29	33	6	17	61	7	57
6	3	49	34	6	23	62	7	61
7	3	68	35	6	29	63	7	65
8	3	85	36	6	35	64	7	69
9	4	00	37	6	41	65	7	73
10	4	14	38	6	47	66	7	77
11	4	28	39	6	52	67	7	81
12	4	40	40	6	58	68	7	85
13	4	52	41	6	63	69	7	89
14	4	63	42	6	68	70	7	93
15	4	74	43	6	74	71	7	96
16	4	85	44	6	79	72	8	00
17	4	94	45	6	84	73	8	04
18	5	04	46	6	89	74	8	07
19	5	13	47	6	94	75	8	11
20	5	22	48	6	99	76	8	15
21	5	31	49	6	04	77	8	18
22	5	39	50	7	08	78	8	22
23	5	47	51	7	13	79	8	25

G

Weight pounds.	Diameter		W.	Diameter		W.	Diameter	
	Inc.	Cent.	po.	Inc.	Cent.	po.	Inc.	Cent.
80	8	29	87	8	52	94	8	74
81	8	32	88	8	55	95	8	77
82	8	35	89	8	59	96	8	81
83	8	39	90	8	62	97	8	84
84	8	42	91	8	65	98	8	87
85	8	46	92	8	68	99	8	90
86	8	49	93	8	71	100	8	93

The Use of the foregoing Table.

First, Suppose you would know how many Pounds a Bullet will weigh, whose Diameter is 7 Inches, and 77 Centesms, look in the Table for 777, and you will over against it on the Left Hand find 66 Pounds, which is the Weight of the said Bullet.

Secondly, Suppose you would know the Diameter of a Bullet, whose Weight is 26 Pounds, and over against 96 on the Right Hand you will find 8 Inches, and 81 Centesms, which is the Diameter sought.

After this manner the Diameter may be readily found by the Weight of any Spherical Solid Iron Shot, from $\frac{1}{2}$ a Pound to 100 Pounds, and contrarily the Weight by the Diameters.

P R O P. X.

To make Cartridges, Moulds and Formers, for any sort of Ordnance.

Cartridges are made either of Canvas or Paper Royal, either of which being prepared, take

take the height of the Bore of the Piece, and allow $\frac{1}{2}$ part of the Diameter for the Vent, and let the Piece of Cloth or Paper be 3 times the Diameter of the Bore or Chamber of the Piece for the Breadth, and for the Length according as your Piece is, (that is to say) for the Cannon, the Length of the Cartridge must be 3 Diameters; for Culverins, Sakers, Falkcons, &c. 4 Diameters, leaving at the Top or Bottom one Diameter more for the Bottom of the Cartridge, cutting each Side somewhat larger for the sewing and gluing them together; having always a due respect for the augmenting or diminishing of your Powder, according to the Goodness or Badness thereof, and to the extraordinary overheating of your Piece.

You must have a Former turned to the height of the Cartridge, and a convenient Length longer than the Cartridge; before you paste or glue your Paper on the Former, you must allow it, so will the Canvas or Paper slip off without tearing; if you make Cartridges for Taper-bored Guns, your Former must be taper accordingly; if you make your Cartridges of Canvas, you must allow one Inch for the Seams, if of Paper, three quarters of an Inch (more than your three Diameters) for the Pasting; when your Cartridges are upon the Former, you must have a Bottom ready fitted, which is to be pasted close and hard round about; then let them dry, and when they are very dry, mark them how high they ought to be filled; the

Powder allowed to each Gunner is as followeth, viz. For Cannon of 7, or Bastard Cannon, 18 l. of Powder; for Demi-Cannon 15 l. for 24 Pounders 11 l. for whole Culverin 10 l. for 12 Pounders 8 l. for Demi-Culverins 7 l. and so of the rest.

A Table of Gunnery; shewing the Weight of fortified Guns, the Height of the Bore, the Height of the Shot, the Weight of the Shot, Powder for Proof, Powder for Service, Paces (5 Foot to a Pace.) The Piece shoots Point-blank, and the utmost Random the Piece mounted to 45 Degrees.

Names	Guns Weight.	Height of Bore.	Height of Shot.	Weight of Shot.	Powder for Proof.	Powder for Service	Pieces Point-blank	Utmost Random.
	C.			li.	li.	li.		
Can.	870	8	7.75	63	28	23	180	00
Can.	760	7	6.75	42	24	18	180	1800
Dem. C.	50	6.3	6.05	32	20	15	180	1800
24 l.	40	5.87	5.62	24	17	11	180	1810
Culv.	40	5.32	5.07	18	14	10	184	1840
12.	354	46	4.64	12	10.5	8	178	1780
Dem. C.	304	4.25	4.03	2	9	7	175	1750
Saker.	203	3.58	3.40	5.25	5.25	4	160	1600
Minion.	123	3.35	3.35	4	4	3	120	1200
Falcon.	51	2.68	2.68	2.52	3	1.5	120	1200

P R O P. XI.

How to know what Proportion one Metal hath to another.

The common received Proportions for Metals are these :

Lead is to Iron, as 2 to 3.

Lead is to Brass, as 24 to 19.

Lead is to Stone, as 4 to 1.

Iron is to Brass, as 16 to 18.

Iron is to Stone, as 3 to 8.

The Reader taking these Proportions into Consideration, may with Ease Calculate (if Iron Shot be wanting) what Height and Weight either Shot of Lead, Brass or Stone; ought to be of, to fit any Piece of Ordnance; the Stone here meant is Marble or Pebble Stone, they being most fit for Bullets.

P R O P. XII.

How much Rope will make Breechings and Tackles for any Piece.

You may take this for a Rule, That as many Foot as your Piece is in Length, so many Fathom of Rope must there be in one Tackle, and their Breechings to be four times the Length of the Piece, with some Overplus for fastning at both Ends. If your Piece accidentally break her Tackles and Breechings, the best Way is to dismount her.

P R O P. XIII.

To renew and make good again any sort of Gunpowder that hath lost its Strength by Moisture, long lying, or by any other Means.

Having moistened the said Gunpowder with Vinegar, or fair Water, beat it well in a Mortar, then sift it thro' a fine Sieve or Searse, and to every Pound of Gunpowder mingle one Ounce of Salt-Petre that hath been mealed, and when you have so done, beat and moisten this Mixture again, untill you see, by breaking or cutting with a Knife, that there is no sign of Salt-Petre or Brimstone in it; when the Petre is thus incorporated, corn it, and you have done.

P R O P. XIV.

To preserve Powder from decaying.

To do this, you are once in a Fortnight or three Weeks to turn your Barrels and Cartridges upside down, that the Petre may be dispersed to every Part; for if it stands long, the Petre will descend downwards, and by that means the Powder at the Bottom will become stronger than the Powder at the Top, which often shaking and turning will remedy.

P R O P. XV.

How to make Granadoes to cast with Mens Hands.

They are made upon a Mould, made with
Twine,

Twine, and covered over with Cartridge-Paper, and Musquet-bullets cut in two, put with Paste, and bits of Paper, thick on the out-side; after you have doubled the Shells, paste on some at a time, and let it dry, then put on more till it be quite full; then dip it in scalding Rosin or Pitch, and hang it up for your Use; the innermost End of the Twine must be left out; and before you pitch it, you must draw out the Twine, and stop the Hole, and then pitch it; these Shells must be filled with fine Gunpowder, then make a Fuse of one Pound of Gunpowder, six Ounces of Salt-petre, and one of Charcoal; this done, knock the Fuse up to the Head within one quarter of an Inch.

Then stop the rest of the Holes in the Granado (if there be any) with soft Wax, then coat it with Pitch and Hurds, lest it should break with the Fall; and be sure when you have fired the Fuse, cast it suddenly out of your Hand.

P R O P. XVI.

To make Powder Chests.

They are to be made of three Boards, two of which are two be nailed together like the Ridge of a House, and the other Board, which must be longer and broader, must be for the Bottom thereof; between these three Boards put a Cartridge of Powder, then make it up like a Sea-Chest, and fill it with Stones, Nails, and pieces of

G. A. old

old Iron; then nail on the Cover and the Ends to the Deck, in such a place that you may fire the Powder underneath thro' a Hole made to put a Pistol in.

P R O P. XVII.

To make Powder Pots.

They are made of Potter's Clay, with Ears to the Matches, lighted at both Ends; they are to be filled with dry fine Powder, and are to be thrown upon the Enemy's Decks, or elsewhere, in time of Action; these Pots may likewise be filled with this Composition, *viz.*

Take fine Powder, mixed with some Brimstone, beaten small, put therein some *Assa Fetida*, some pieces of Verdigreese, and some Camphire; *Pots* filled with this Composition, and thrown into a Ship's Round-house, or betwixt the Decks, will be very offensive to the Enemy.

P R O P. XVIII.

Necessary Instructions for Sea-Gunners.

When first a Gunner cometh into a new Ship, he is to measure his Guns, to know whether they, or any of them, be full Fortified, Re-inforced, or Lessened, in Metal; that done, he is to draw and make clean all his Guns within, so that there may not any thing remain within that may do Harm; then he is to search all his Guns within, to know

know if they be Tapered, Chambered, or true Bored, or whether they be Cracked, Flawed or Honey-combed, within; then he is to find what Ball she shoots, and mark the Weight of the Ball over the Port, that thereby he may set the same Mark upon the Cartridge and Case, which will be a Means to prevent mistakes in time of Service.

The Guns being dimentioned and cleaned as aforesaid, he is to take half a Ladle of Powder for every Gun, and blow them off, sponge them well; and finding them clean, load them with their respective Cartridges and Powder, which is to be rammed home with a strait Wad after it. Then let the Ball roul home to the Wad, and set the Wad close home to the Ball, that it roul not out with the tossing of the Ship; then must he Tamken that Piece at the Mazzle with a wooden Tamken, which is to be tallowed round about to preserve the Powder from Water; likewise make a Tapen of Ockham for the Touchole, and tallow it also, to prevent the Water from coming to the Powder that Way; then put the Apron over it, and fasten your Piece as you see Occasion,

The Piece being loaded and fast, the Gunner is to have 24 Cartridges at least ready made; that is to say, 12 filled and 12 empty; and he must be very careful, so long as the Gunner's Crew are busy with the Powder, that there be no burning Match of Fire in the Ship; also to lay his Cartridges in

Barrells or Chests in fort, that when there is Occasion to use them, they may be brought without Abuse: Likewise he is to fort his Pall, and lay every fort by themselves in several Cases, and upon every Case set the Weight of one of the Shot that is in them.

If it fall out (at any time) that new Ports must be cut in the Ship, the Gunner is to take Care that they be above a Beam, or as near as possible; also that they be not higher or lower than the Port before; likewise that there be Room for the Guns to play, because if one Gun should be dismounted, there might another be brought to her place: And observe that the Carriage stands on her Trucks, the uppermost part of the Carriage must come to stand in the Middle of the Port up and down, that a Man may lay his Piece as he pleaseth.

He must be careful that the Powder in the Powder-room be well covered with Hides; also that the Axle-tree of the Trucks be well soaped; also that his Ropes, Rammers and Sponges, be ready at hand; and he must not let the Powder be untuned above a Month, and he must every Month draw his Guns if he fears there be any Wet got to the Powder; and he must be careful of the Candle and Fire about the Gun-room and Powder-room, to prevent Danger. Likewise he must keep a good Account of all Materials that belong to the Guns; as Balls, Match and Powder; what part thereof he spends, and also what remains.

The

The Gunner must use all Dilligence before he Encounter with his Enemy, to set a Barrel of Water betwixt every two Guns, that when they see conveniency they may dip the Spunges therein to cool the Pieces.

Also the Gunner must be sure that there be no melted stuff or Fireworks done in the Ship, for it is dangerous : Likewise there may no Fire-work be brought above in the Round-house or Cabbin to stand, for fear of Shot, but must be kept below till time of need, either in the Powder-room, or Steward's-room, to prevent Mischief.

P R O P. XIX.

What Necessaries a Sea Gunner ought to be furnished withall for his Ordnance.

The Necessaries that a Gunner ought to have for his Ordnance are many, and the Quantity is according to the Quantity and Quality of his Guns ; and also, if he be in a Man of War, or Merchant-man, then there is difference of Provisions ; I will only name them, and so leave it to every Gunner's own Discretion to take what Quantity of each he thinks will serve his Occasion, and at the Voyage end give an account what is spent, and how it was spent, and what there is yet remaining ; the Necessaries are these that follow, *viz.*

Powder ; Round Shot of several sorts ; Double-heads in sort ; Cut Iron of a Foot, or Foot and half long ; Wooden Tamkens in sort ;

fort ; Cartaridge Paper ; Thread, Needles, Twine, Starch and Match ; Mallets, Hand-spikes , Rammer-heads , Worms , Ladles, Sponge-heads, with Staves, Beds and Quoins, in fort ; old Shrouds for Breeching, and twice laid Stuff for Tackles ; Lashers, Double and Single Blocks ; new Rope for Double Tackles ; some old Shrowds for Sponges ; some Lines, Marline, Tar'd Twine, Portropes, Moulds for Cartridges, Axle-trees and Truck, Budg-barrels, and Lint-spindles, Crows, Splice-irons, Primes, Staples and Rings, Tackle-hooks, Nails, Thimbles, Port-bands, Sheet-lead, and Lead-shot ; old Canvas, Scales and Weights, Lanthorns, Dark - lanthorns, Powder measures, Soap, Horns and Priming-irons, Nippers, Pliers, Moulds to cast Leaden Bullets, with what other Necessaries he thinks needful.

How to Extract the Cube Root.

First, A Cube Number is either Simple or Compound.

Secondly, A Simple Cube Number is that which hath for its Root or Side one of the 9 Digits, and is therefore always less than 1090. So 216 is a Simple Cube Number, whose Root or Side is 6. All the single Cube Numbers, and Square Numbers, together with their respective Roots, are express'd in the following Table.

Roots	1	2	3	4	5	6	7	8	9
Squares	1	4	9	16	25	36	49	64	81
Cubes	1	8	27	64	125	216	343	512	729

Thirdly, A Compound Cube Number is that which is produced by the Multiplication of a Number, (consisting of two places) at the least three times into it self, and is therefore never less than 1000 ; so 2744 is a Compound Cube Number, produced by the Multipling 14 into its self 3.

To prepare a Compound Number for Extraction, put a Point over the first place towards the Right Hand, (to wit, the place of Units) then passing over the second and third places, put another over the fourth, and so proceed (by putting a Point over every third Figure) till you have finished your Pointing ; then you must draw a crooked Line on the Right Hand of the said Cube, behind which you are to place your Root ; as in the following Example.

Example.

What is the Cube Root of 262144 ?

First, Point the Number given, and draw a crooked Line, as you have been taught.

Secondly, That done, find out the Cube Root of the first Cube (262 ;) but because it is not an exact Cube Number, you are to take the Cube Root of that Number in the foregoing Table, which being lesser, yet is nearest to it (which is 6,) and place it behind the crooked Line, for the first Figure in the Root.

Thirdly, This being done, Cube the Figure placed in the Root, and subtract the Cube from the first Cube of the given Number,
(viz,

(viz. 262) and subscribe the Remainder.

Fourthly, Bring down the next Cube, (144) and annex it on the Right of the said Remainder, (46) and it makes 46144 which call the Resolvend.

Fifthly, Draw a Line under the Resolvend, then Tripple the Root, (that is, multiply it by 3,) which Tripple must be placed under the Resolvend, in such sort that the place of Units in the said Tripple may stand under the place of Tens in the Resolvend.

Sixthly, Square the Root, (6,) and Tripple the said Square of the Root, and place the said Tripple Square under the said Tripple Root, in such order that the place of Units in the Tripple Square of the Root may stand under the place of Tens in the Tripple Root.

Seventhly, Draw a Line underneath the said Tripple Root, and Tripple Square of the Root, and add them together in the same order as they stand, so shall their Sum be a Divisor.

Eighthly, Draw a crooked Line on the Left Hand of the Resolvend, before which the said Divisor must be placed, then let the whole Resolvend, (the place of Units excepted) be esteemed a Dividend; then seek how often the said Divisor is contained in the said Dividend, and put the Answer for the next Figure in the Root.

Ninthly, Draw a Line under the the Work, and then Cube the Figure last placed in the Root, and place its Cube underneath the Resolvend

solvend in such sort that the place of Units in the one may be underneath the Units in the other.

Tenthly, Square the Figure last placed in the Root, and Multiply its Square by the Tripple Root subscribed underneath the Resolvend; (as is directed in the fifth Step foregoing) and subscribe the Product under the Cube last put down, in such Order that the place of Units in the said Product may stand under the place of Tens in the said Cube.

Eleventhly, Multiply the Tripple Square of the Root (subscribed as is directed in the sixth Step foregoing) by the Figure placed in the Root, and place the Product under the Number last subscribed in such manner that the place of Units in this may stand under the place of Tens in that.

Twelfthly, Draw another Line under the Work, and add the 3 Numbers together that were last placed under the Divisor in the same Order as they stand, and call the Sum the *Subtrahend*, which is to be subtracted out of the Resolvend, noting the Remainder, (if there be any.) View the whole Work as followeth:

262144 (64
216

1998(46144 Resolvend.

18 Tripple Root
108 Tripple Square of the Root.

1098 Divisor.

64 Cube of 4.
288 Square of 4 in the Tr. Root.
432 Tr. Square of the Root in 4.

46144 Subtrahend.

(o)

Here is three things to be observed from the Rules before delivered concerning the Extraction of the Cube Root.

Observe 1. That the Work contained in the 2d, 3d and 4th Steps (or Rules) for finding out of the first Figure of the Root, is not again to be repeated; but the Work of all the Rules (or Precepts) following is to be repeated as often as a new Figure is put in the Root.

Observe 2. For every particular Cube (or Point) in the Number given (except the first) there is to be found a new Resolvend, by bringing down and annexing the next Cube to the Remainder; and as often as there

there is a Resolvend, so often there must be found a new Divisor; and as often as there is found a new Divisor, so often must be found a new Subtrahend.

Observe 3. When the Subtrahend chanceth to be greater than the Resolvend, the Work is erroneous, which must be corrected by putting a lesser Figure in the Quotient.

Hitherto hath been spoken concerning the Extraction of the Cube Root of Cubick or Rational Numbers.

But if when all the Points or Cubes in the given Number are finished, there be yet a Remainder after the last Subtraction, such are called Surd Numbers, (being incommensurable to their Cube Roots) whose Cube Roots, tho' they be inexplicable by Numbers, yet may be obtained infinitely near by an Opproximation, according to the following Directions, *viz.*

When a Surd Number is proposed for Extraction, proceed therewith as you did in the last Example till all the Points are finished, and then there will (always) be a Remainder; and to find the Decimal Fraction to be annexed to the Root found, to bring it nearer to the Truth, proceed thus:

Place three Cyphers on the Right Hand of the Remainder for a new Resolvend, and so continue the Extraction (as you have been taught) and there will be produced one Figure more to be placed in the Quotient, which is the first Figure (or place of Tens) in the Decimals, and so by a continual annexing

annexing of three Cyphers to every last Remainder, you may continue the Extraction to as many places of Decimals as you please. For as many Ternaries of Cyphers as are annexed, so many places of Decimals are in the Root, which are to be distinguished from the Left by a Comma.

The Extraction of the Cube Root is thus proved; *viz.* Cube the Root, and to the last Product add the Remainder, (if there be any) and if that Sum be equal to the Number given, (respect being had to the Cyphers, if any be added) the Work is truly performed, otherwise not.

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A Table to find the Cube Root of any Number, not exceeding 1900000.

The Root.	The Cube	The Root.	The Cube.	The Root.	The Cube
1. 25	1. 95	7. 5	421.87	17. 5	5359
1. 5	3. 37	7. 75	465.48	18	5832
1. 75	5. 36	8	512	18. 5	6332
2	8	8. 25	561.51	19	6859
2. 25	11. 39	8. 5	614.12	19. 5	7415
2. 5	15. 62	8. 75	669.92	20	8000
2. 75	20. 80	9	729	20. 5	8612
3	27	9. 25	791.45	21	9261
3. 25	34. 33	9. 5	857.37	21. 5	9938
3. 5	42. 82	9. 75	926.89	22	10648
3. 75	52. 73	10	1000	22. 5	11390
4	64	10. 5	1015.76	23	12167
4. 25	76. 77	11	1331	23. 5	12708
4. 5	91. 12	11. 5	1520.87	24	13824
4. 75	107. 17	12	1728	24. 5	14705
5	125	12. 5	1953.12	25	15625
5. 25	144. 90	13	2197	25. 5	16581
5. 5	167. 37	13. 5	2460.59	26	17576
5. 75	190. 11	14	2744	26. 5	18609
6	216	14. 5	3075.25	27	19683
6. 25	244. 14	15	3375	27. 5	20797
6. 5	274. 62	15. 5	3724	28	21972
6. 75	307. 55	16	4096	28. 5	23149
7	343	16. 5	4492	29	24389
7. 25	381. 08	17	4913	29. 5	25672

The Rt.	The Cube	The Rt.	The Cube	The Root.	The Cube
30	27000	54	157464	79	493039
30	28372	55	167375	80	512000
31	29791	56	175616	81	531441
32	32768	57	185193	82	550808
33	35937	58	195112	83	571787
34	39304	59	205379	84	592604
35	42825	60	216000	85	614125
36	48656	61	226981	86	636056
37	50653	62	238328	87	648303
38	54874	63	250047	88	681472
39	55419	64	262244	89	705669
40	64000	65	274625	90	729000
42	68921	66	287495	91	753571
42	74088	67	300753	92	778688
43	7907	68	314432	93	804357
44	85184	69	342199	94	830584
45	91125	70	331000	95	871375
46	97330	71	357911	96	884736
47	103823	72	373348	97	925673
48	110592	73	389017	98	941192
49	117049	74	405224	99	970299
50	125000	75	411875	100	1000000
51	135651	76	438976		
52	140608	77	456233		
53	148877	78	474522		

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All Persons are desired to beware of a pretended *Balsam* of *Chili*, which for about
this

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